The Foundry

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One-Piece Casting,

Length 61 feet 8½ inches

This mammoth steel job is typical of the work of

GENERAL STEEL CASTINGS CORP.

EDDYSTONE, PA., PLANT

The assembly consists of

500 to 600 CORES

and ALL LINOIL cores

The confidence foundrymen impose in Linoil is not merely something of which we may justly feel proud, it is the considered judgment of experts and masters on the quality and dependability of an essential material on which they are well qualified to pass. It is a judgment and verdict which all must respect, who are called upon to choose a core oil. General Steel Castings Corporation has used Linoil for many years. + + Locomotives by Baldwin for Santa Fe.

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Canada—WERNER G. SMITH, Ltd. *Factory—Toronto*

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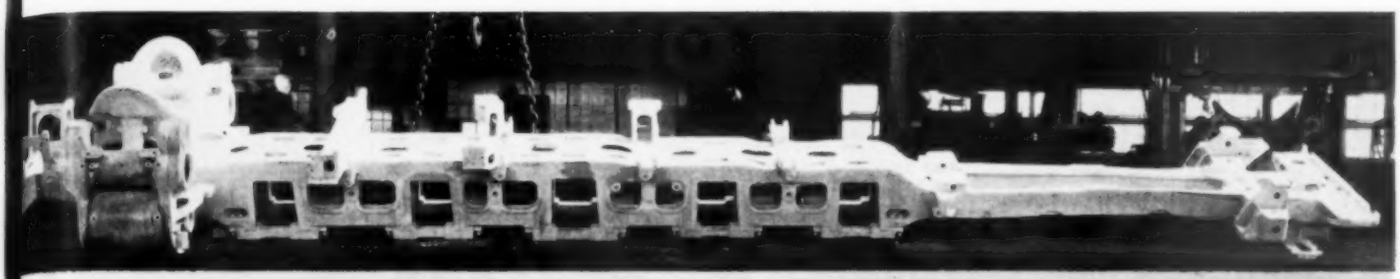
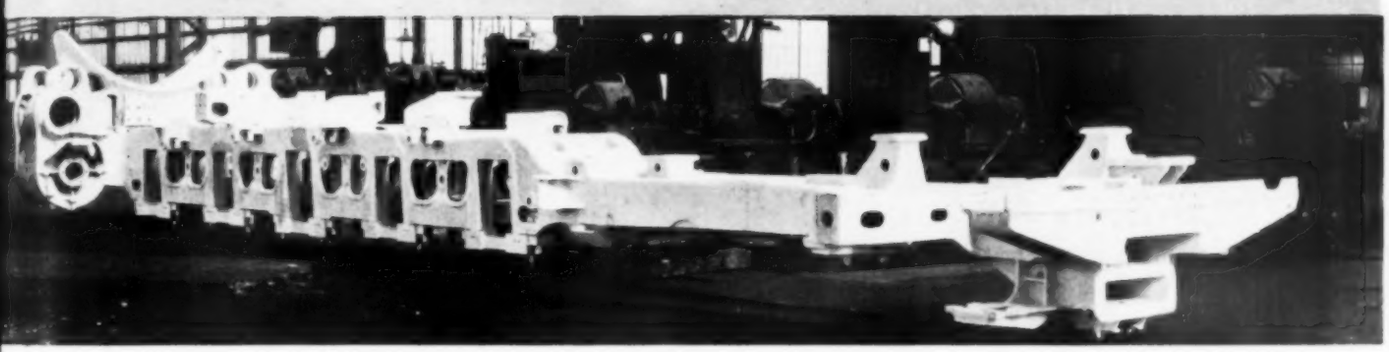


LINOIL



Rome was not built in a day and neither was Linoil. Linoil is the result of years of intimate study of foundry needs. It is our recognition of the fact that foundries live not by good castings alone but also by profit on castings. Linoil is honestly made and never betrays the foundryman's trust.

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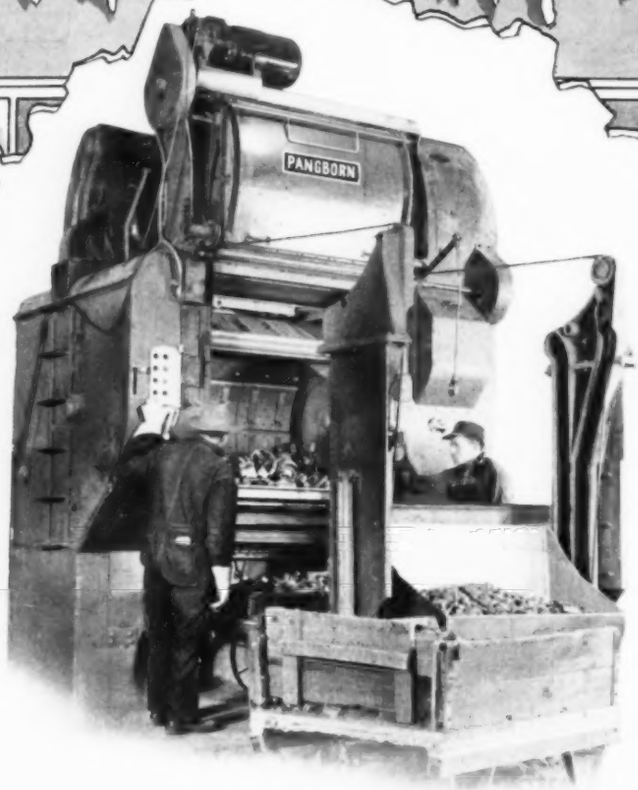

PANGBORN AIRLESS ROTOBLAST BARREL WITH AUTOMATIC LOADING DEVICE. FOUR STANDARD SIZES ARE 7, 14, 21 AND 28 CU. FT. CAPACITIES PER LOAD. SEND FOR BULLETIN.

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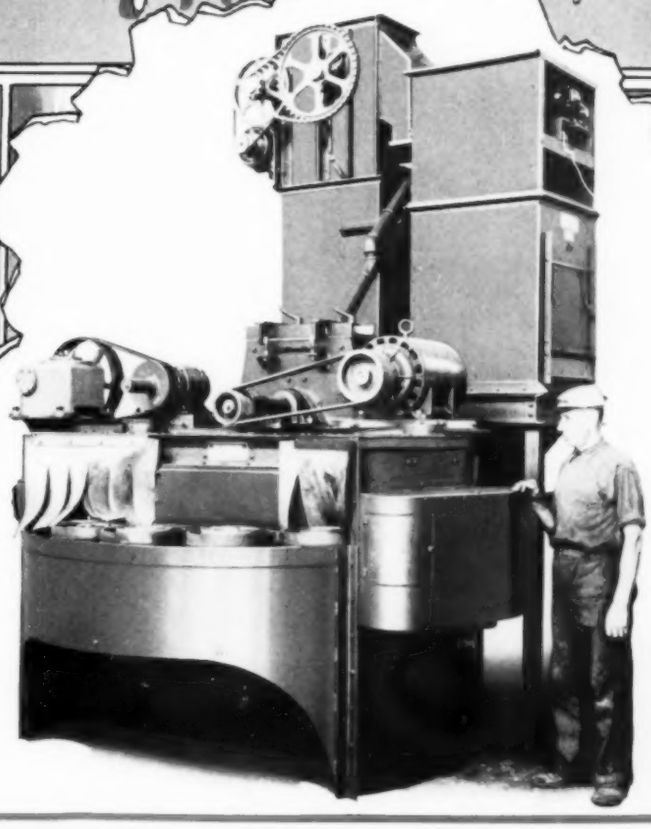

PANGBORN AIR-LESS ROTOBLAST TABLE WITH AUX-ILIARY MULTIPLE SPINDLE TABLES FOR CLEANING SPECIAL WORK. STANDARD SIZES ARE 6, 8 AND 15 FT. DIAMETER TABLES. SEND FOR NEW TABLE BULLETIN JUST RELEASED.

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WISCONSIN STEEL COMPANY

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Full Value in Every Pound and Every Pig!

• Wisconsin Steel Company operates ore mines on the Mesabi Range, eastern Kentucky coal mines, ore boats, coke ovens, blast furnaces, and pig machines. As a result, our merchant iron production is entirely within our control from mine to mold, with a competent staff of technical men in charge—checking and re-checking—every inch of the way. Ask us to give you more complete details concerning Wisconsin Iron and the consultation service offered without obligation by our staff of metallurgists and foundrymen.

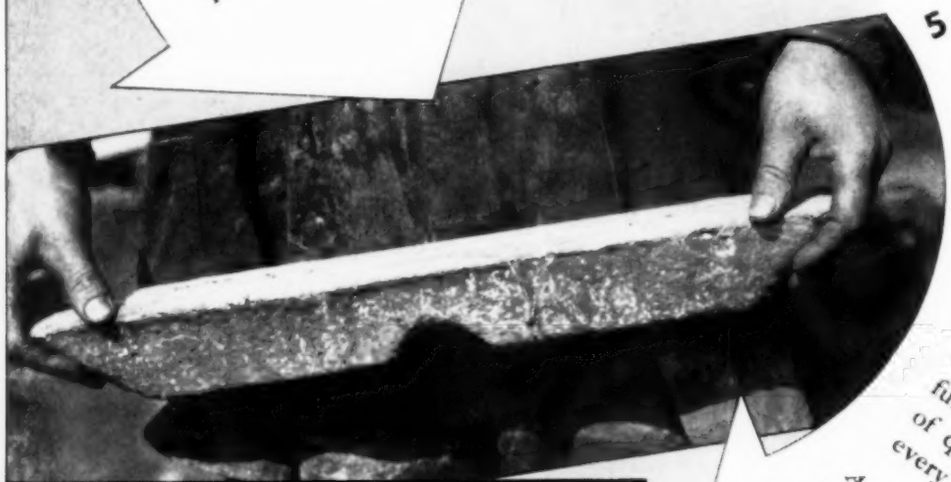
WISCONSIN STEEL COMPANY
180 North Michigan Avenue Chicago, Illinois

1 Iron that is *"Better Controlled from Mine to Mold."*

2 Immediate delivery of Pig Iron in all grades and specifications.

3 Blast furnaces devoted exclusively to the merchant iron trade.

4 Services of skilled metallurgists and practical foundrymen.



5 Clean, easy-to-handle Pigs in the popular small size.

6 Iron of even, close grain . . . for uniform quality and dependable results.

WISCONSIN PIG IRON is being used successfully by manufacturers of quality castings in every line of business. Ask us to show you what we can do for you.

WISCONSIN PIG IRON

Better Controlled from Mine to Mold

Greetings...

TO THE FOUNDRY INDUSTRY

The entire personnel of The Great Lakes Foundry Sand Company desires to take this opportunity to say "thank you" for your continued patronage.

Your confidence in our products and service is highly valued and it shall be our continuing endeavor to merit in every detail the increasing business placed with us by the foundry industry.

It is our earnest hope that the coming year will be one of increased production and prosperity.

★

THE GREAT LAKES LINE

Bank Sands
Molding Sands
Lake Sands
Ottawa Silica Sands
Ground Silica
Great Lakes Coroil
Bentonite
Rebonding Clays
Fire Brick & Clay
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A. B. C. Foundry Coke
Steel Abrasives
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Limestone
Sand Blast Sands

QUALITY
DEPENDABILITY
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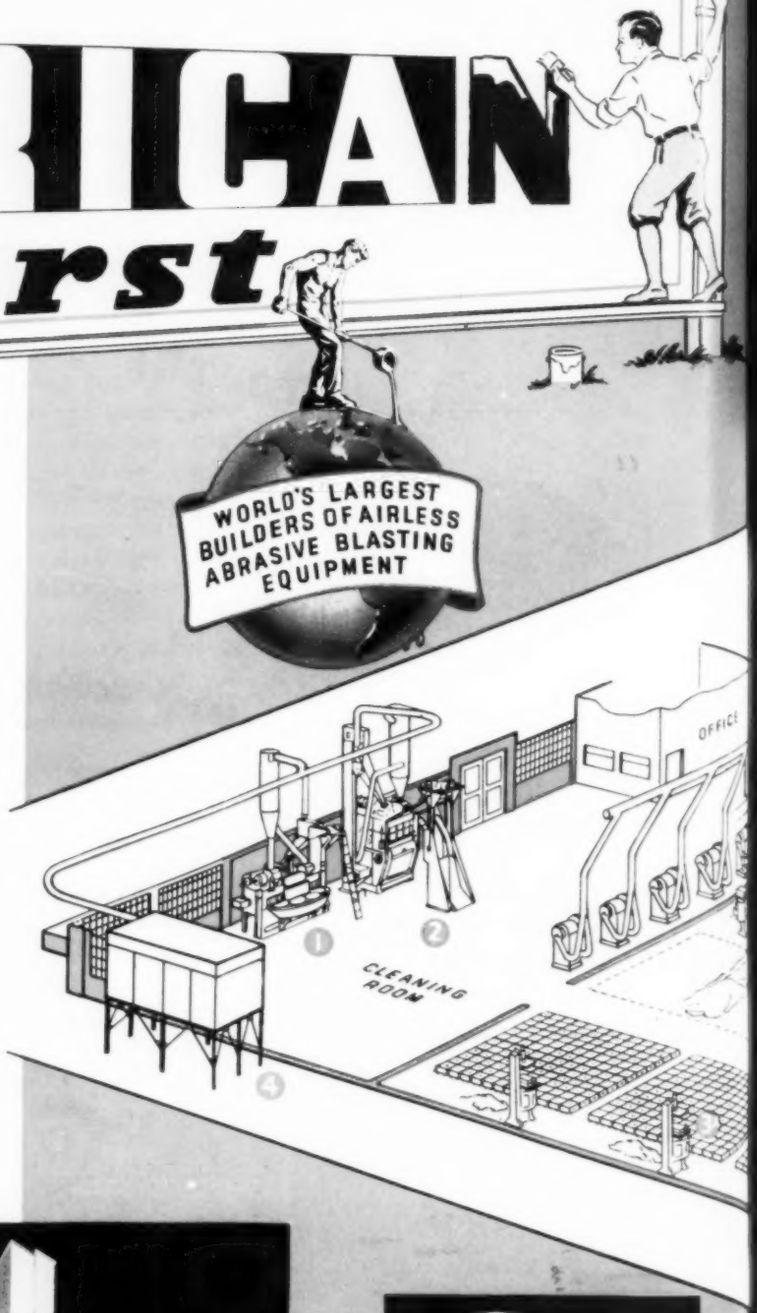
Great Lakes Foundry Sand Co.
UNITED ARTISTS BLDG. DETROIT, MICHIGAN

MINERS — PROCESSORS — FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE

See AMERICAN First



FOR foundry equipment that proves itself day after day, specify American —and be sure of profitable results.

Over a quarter-century of experience in building cost-reducing equipment is your assurance of complete satisfaction.

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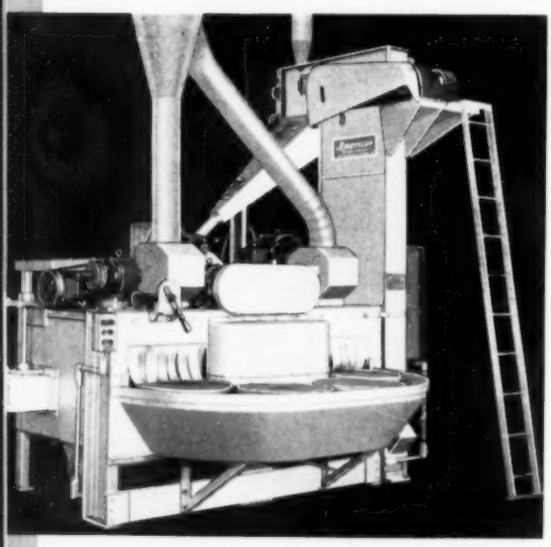
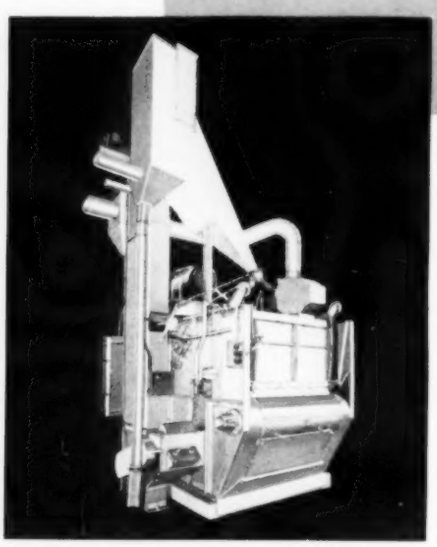
Our engineers and sales representatives will be glad to work with you at any time on any of the problems within the scope of their experience. You can depend upon their recommendations.

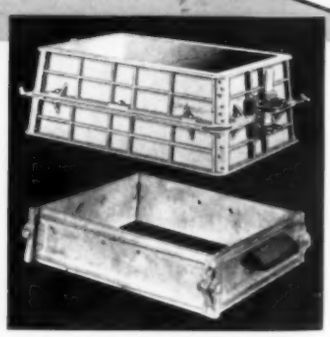
Descriptive literature is available on all products illustrated—write today.



1 THE AIRLESS WHEELABRATOR TABLAST is designed for cleaning flat, fragile or thin-section work which cannot be tumbled. Available in one plain-table model and in three multi-table models for cleaning work of the smallest size up to 48 inches in diameter. Write for descriptive literature.

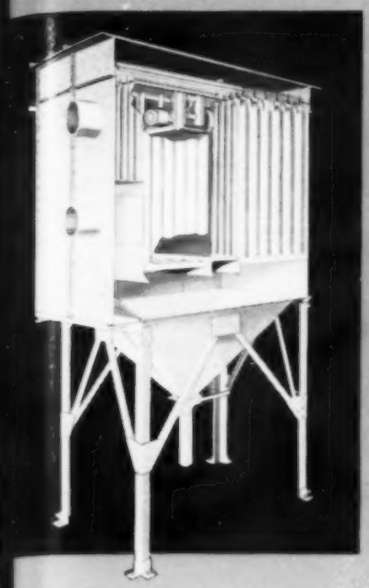


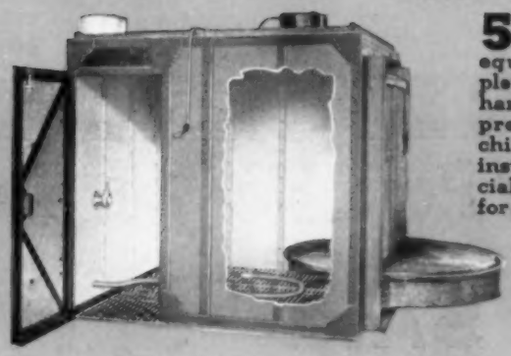
2 THE AIRLESS WHEELABRATOR TUM-BLAST is made in five sizes, the smallest of which has an operating load capacity of 2 cubic feet. The largest model has an operating load capacity of 20 cubic feet and handles work averaging from 200 to 300 pounds per piece.



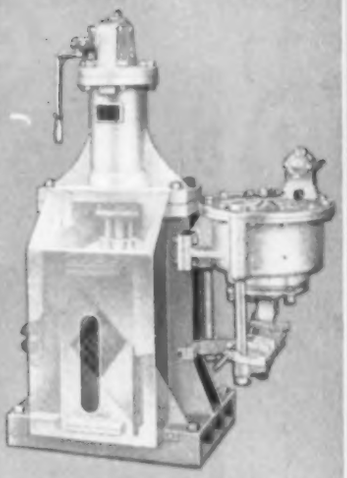
3A AMERICAN TAPER STRIP FLASKS are made in numerous sizes, both Aluminum and Dow Metal.

3B AMERICAN POURING JACKETS are supplied in the following types: Steel Plate, Aluminum (Flexible) and Cast Iron (Flexible).





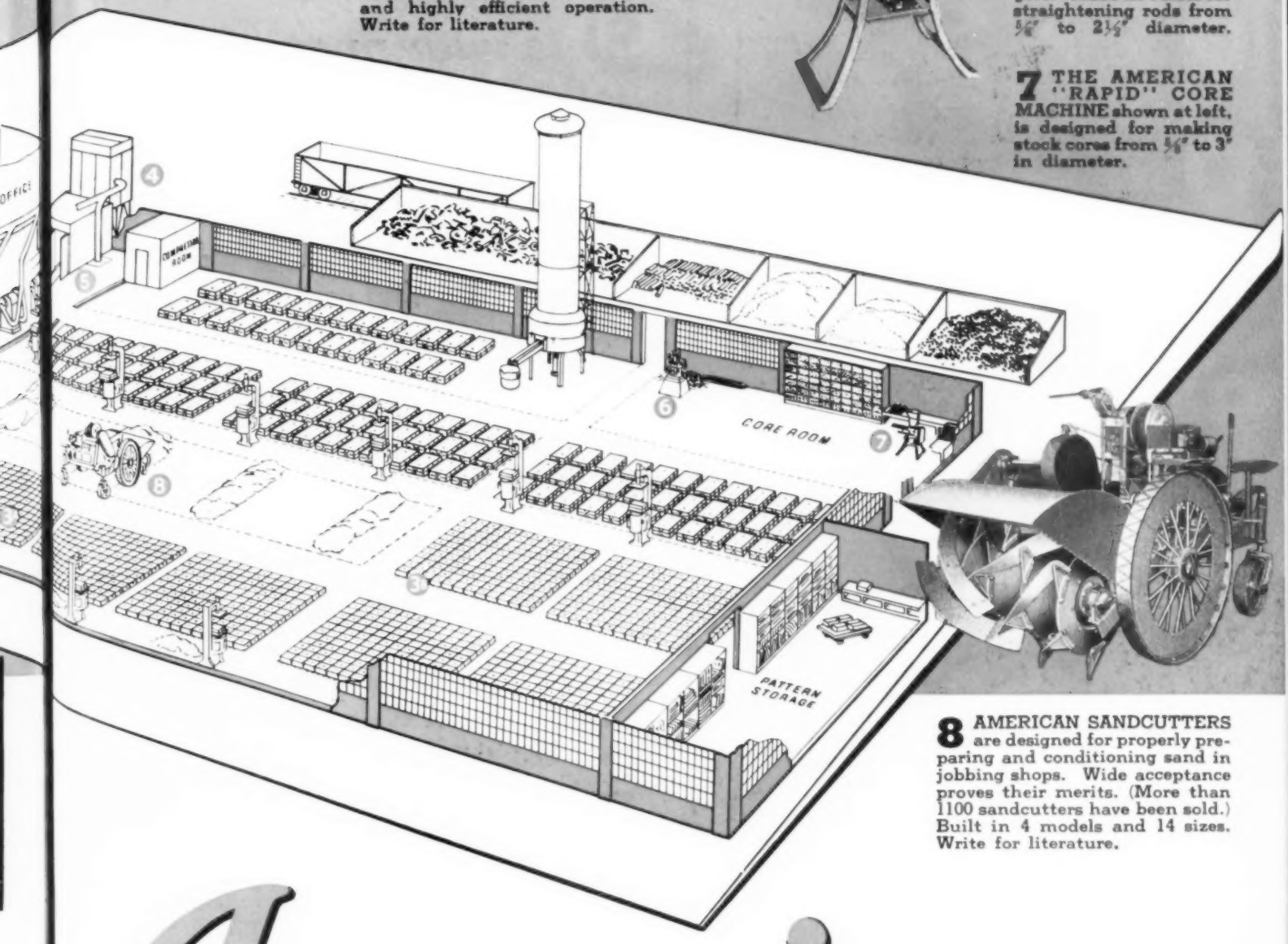
5 AMERICAN SAND BLAST equipment is complete, ranging from hand gun and small pressure tank machines to large room installations and special designs. Send for literature.



4 AMERICAN "DUSTUBE" DUST COLLECTORS are made in sizes for every dust suppression purpose. Features include easy installation — long-lasting cylindrical dust tubes—a highly efficient shaker—simple installation, easy removal and convenient inspection of tubes—and highly efficient operation. Write for literature.

6 ROD STRAIGHTENER AND SHEAR MACHINE, shown above, eliminates waste by reclaiming rods and gaggers. Made in 4 sizes for straightening rods from ⅜" to 2½" diameter.

7 THE AMERICAN "RAPID" CORE MACHINE shown at left, is designed for making stock cores from ⅛" to 3" in diameter.



8 AMERICAN SANDCUTTERS are designed for properly preparing and conditioning sand in jobbing shops. Wide acceptance proves their merits. (More than 1100 sandcutters have been sold.) Built in 4 models and 14 sizes. Write for literature.

American

THE AMERICAN FOUNDRY EQUIPMENT COMPANY

505 South Byrkit Street — MISHAWAKA, INDIANA — Cable Address "AFECO"

WORLD'S LARGEST BUILDERS OF AIRLESS ABRASIVE BLASTING EQUIPMENT

ALL Portable Models of the ROYER SAND SEPARATOR · AND BLENDER ·

are now equipped with 4 wheels—complete with pneumatic tires and roller bearings

Model B-4

Model C-4

This new method of mounting all portable models of this popular foundry equipment will be welcomed by foundry superintendents everywhere.

Any of these models can now be moved quickly and easily over even the roughest foundry floors . . . and into locations which formerly could be reached only with difficulty.

Foundry superintendents now using ROYERS agree that no other equipment can equal them in eliminating sand problems, and this *extra* portability adds greatly to their proven efficiency.

A request from you will bring detailed information, or a service engineer will be glad to call.

ROYER
KINGSTON, PA.
FOUNDRY & MACHINE COMPANY

THE BEST KNOWN
HANNA
NAME IN IRON
MORE THAN 71 YEARS OF CLOSE
ADHERENCE TO SPECIFICATION OVER
THE ENTIRE RANGE OF DEMAND EXPLAINS
WHY HANNA IS "THE BEST KNOWN NAME IN IRON"

BRANDS: BUFFALO · DETROIT · SUSQUEHANNA GRADES: FOUNDRY · MALLEABLE · FERRO-SILICON · SILVERY

THE HANNA FURNACE CORPORATION
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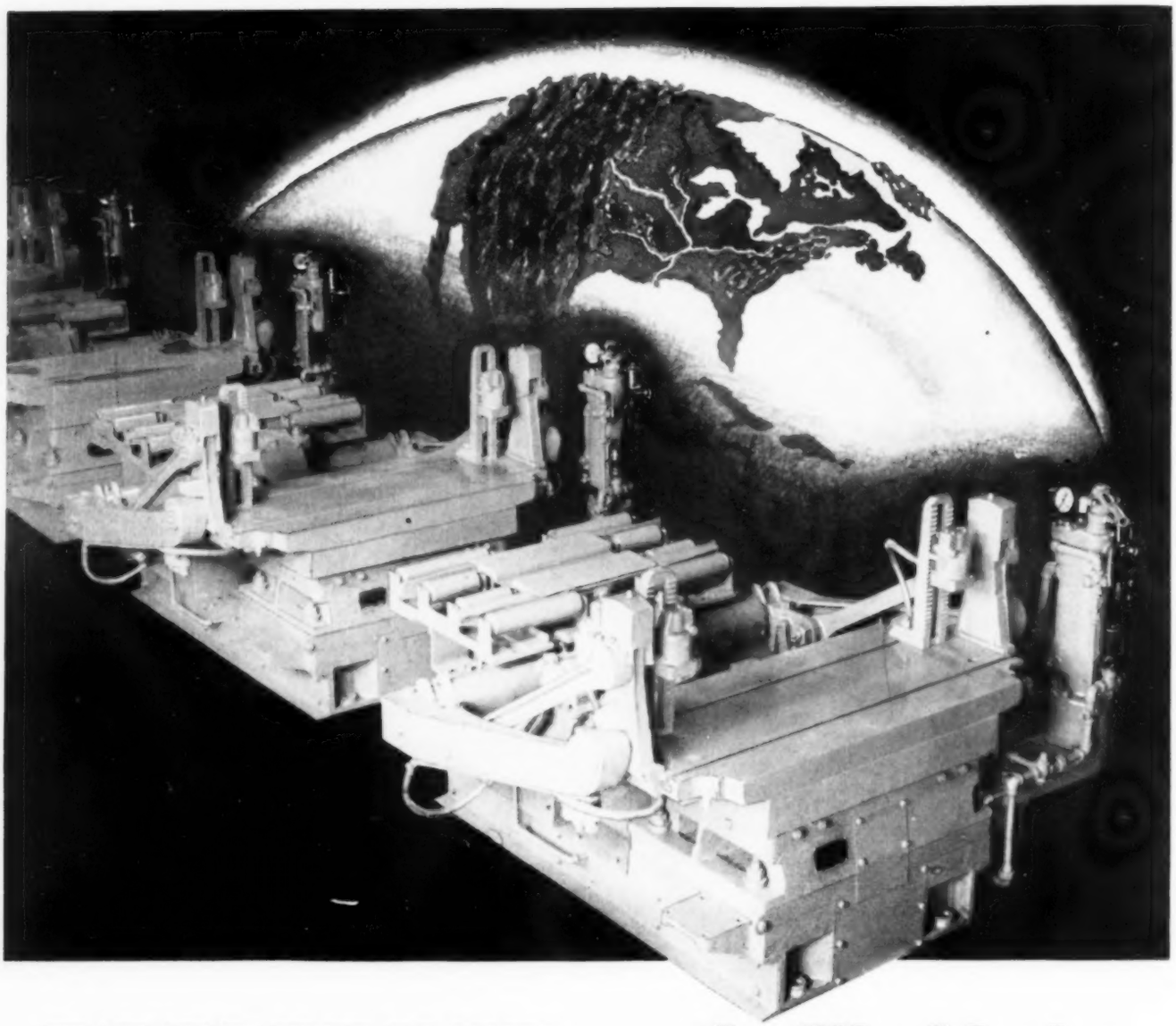
MERCHANT PIG IRON DIVISION
NATIONAL STEEL CORPORATION



PREFERRED . . . the World o'er

In North and South America, Europe, Asia, Africa, and Australia . . . wherever castings must be made *quickly* and *cheaply* . . . you will find HERMANS!

Exclusive Herman features make it the choice of foundrymen and production engineers who must produce a maximum of quality molds at a minimum of cost and time.

Patented Herman rollover action flips a mold through a complete 180 degree roll while the rollover mechanism has gone through only a 90 degree arc. Not found on any other molding machine. *Saves power, saves time, . . . saves money!*

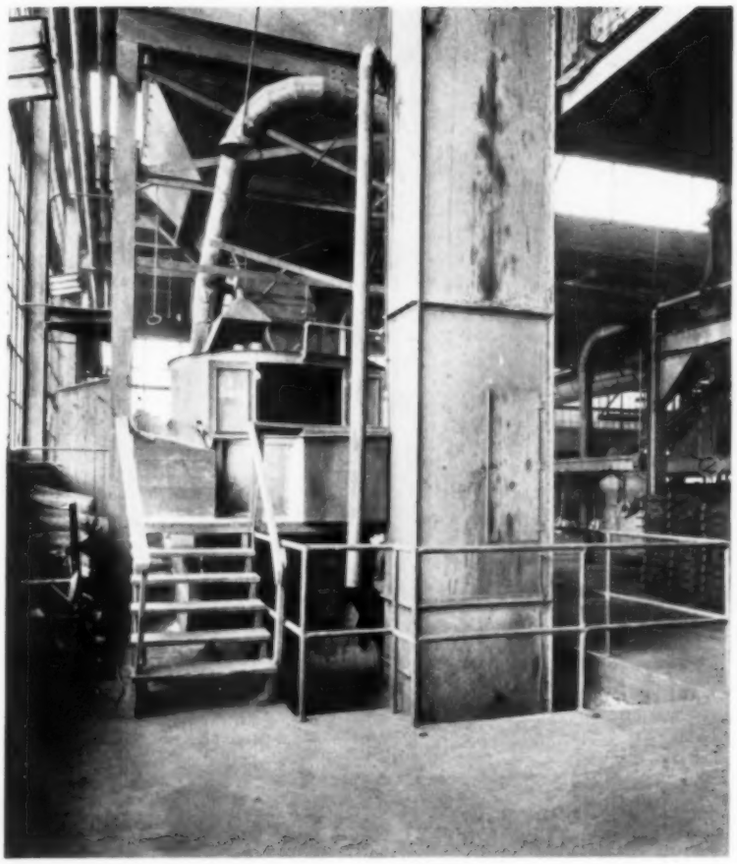
Herman Automatic Timer increases speed of production . . . every mold is certain to be rammed to *its proper density*.

Molds deposited directly on roller conveyor . . . *speeds production*.

Have a Herman representative tell you about other Herman money saving features and what the Herman will do in your foundry.

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

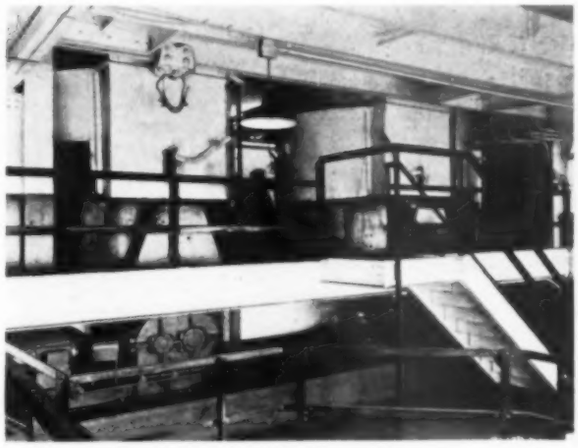


Above:—Installation showing one of two No. 3—8′ Dia. Pan Simpson Mixers each producing 37 tons of sand per hour in a continuous sand handling unit for automotive castings.

SIMPSON INTENSIVE MIXERS

are high production, low-cost machines, built to stay on the job in continuous, heavy-duty service.

Below:—Installation showing 2 of 10 No. 3—8′ Dia. Pan Simpson Mixers in a large automotive foundry. Each machine has regularly produced 42 tons of sand per hour, 7 to 21 hours a day for the past 4 years.



FOUNDRYMEN HAVE USED SIMPSON MIXERS BECAUSE they produce uniform, properly mulled sand at the lowest cost per ton of sand produced; because they are simple and safe to run, low in power and maintenance and readily adjusted for efficient operation on different types of sand,—because they do a day's work and return a profit in the foundry.

Whether your requirements are for separate units on core, facing or backing sands or for use in continuous systems, the latest design Simpson Mixer—with 25 years of constant improvement and reliable service back of it—is a sound investment.

IT PAYS TO USE SIMPSON MIXERS

''THE PRODUCT OF A PRACTICAL FOUNDRYMAN''

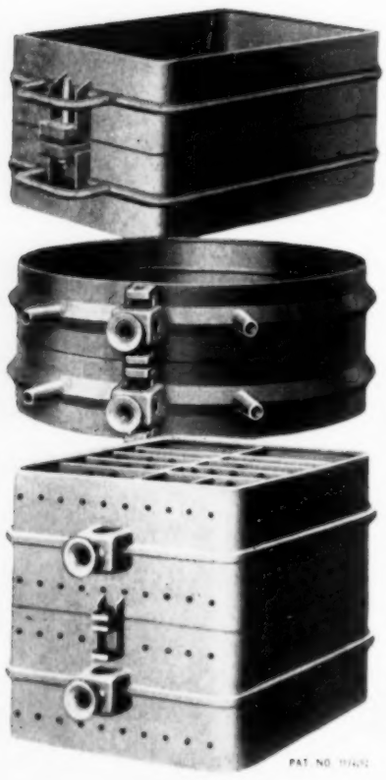
NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING *549 W. WASHINGTON BLVD.*

CHICAGO, ILLINOIS, U. S. A.

MANUFACTURERS AND SELLING AGENTS FOR CONTINENTAL EUROPEAN COUNTRIES—THE GEORGE FISCHER STEEL & IRON WORKS, SCHAFFHAUSEN, SWITZERLAND
FOR THE BRITISH POSSESSIONS, EXCLUDING CANADA AND AUSTRALIA—AUGUST'S LIMITED, HALIFAX, ENGLAND
FOR CANADA—DOMINION ENGINEERING CO., LTD., MONTREAL, CANADA. FOR AUSTRALIA AND NEW ZEALAND—GIBSON BATTLE & CO., PTY., LTD., SYDNEY, AUSTRALIA

Resistance



Ride 'em cowboy! Sometimes on—sometimes off—but you can "bet your boots" that a bronco-buster has to take lots of jolts and punishment during a day's work.

Your flasks are up against a lot of abuse, too. STERLING FLASKS are constructed to resist distortion, wear, and corrosion . . . prepared to meet all foundry problems.

STERLING FLASKS are the only flasks which offer weight advantage with maximum strength and capacity to withstand abuse.

STERLING WHEELBARROW CO.

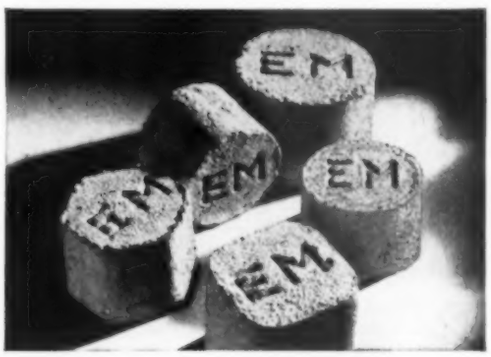
7100 W. WALKER STREET • MILWAUKEE, WISCONSIN

How You Can Obtain Better Iron at Lower Cost in Your Foundry

ELECTROMET FERRO-ALLOYS AND METALS FOR THE CAST IRON FOUNDRY	
Added to the Cupola	*Result*
EM Silicon Briquets (round)	Deoxidize and aid machinability by graphitizing effect. Reduce chill in light sections. Permit easy control of silicon additions.
EM Chromium Briquets (hexagonal)	Increase hardness, wear resistance, corrosion resistance, and heat resistance. Promote greater density. Permit easy control of chromium additions.
EM Manganese Briquets (square)	Act as a scavenger. Harden iron when added in large quantities. Permit easy control of manganese additions.
Added to the Ladle	*Result*
85% Ferrosilicon 50% Ferrosilicon	Deoxidizes and aids machinability by graphitizing effect. Reduces chill in light sections. (85% grade used for large additions.)
Silicon-Zirconium	Deoxidizes and graphitizes, improving density of iron.
Calcium-Silicon Calcium-Aluminum-Silicon Calcium-Manganese-Silicon	Deoxidizes and graphitizes low-silicon irons. Improves machinability of high-strength irons.
Ferromanganese-Silicon	Combines graphitizing influence of silicon with scavenging action of manganese.
Standard Ferromanganese	Acts as scavenger. Hardens iron when added in large quantities.
Special Foundry Grade Ferrochrome	Increases hardness, wear resistance, corrosion resistance, and heat resistance. Promotes greater density.
Ferrovanadium	Refines grain (of value particularly in improving impact strength of hard irons).
Electromet Special Graphitizer	Maintains gray fractures of edges and in light sections. Deoxidizes and improves machinability. Reduces chill.

FOR making alloy additions to cast iron, there is a complete line of Electromet ferro-alloys and metals. Each of these has special uses and produces the results broadly indicated in the table at the left. Correct use of these alloys in your foundry will help you obtain better iron at lower cost.

One of our metallurgists will gladly call at your request and explain when and how to use any of these Electromet ferro-alloys and metals for best results. If you want additional information before requesting this service, send for "Briquetted Alloys for the Cast Iron Foundry," a new booklet on the use of EM briquets; or write for further data on any of the other alloys that may be useful to you. There is no obligation.



EM Silicon Briquets (round) contain exactly one pound (small size) or two pounds (large size) of silicon. EM Chromium Briquets (hexagonal) contain exactly two pounds of chromium. EM Manganese Briquets (square) contain exactly two pounds of manganese and one-half pound of silicon.

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

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Unit of Union Carbide and Carbon Corporation
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Ferro-Alloys & Metals

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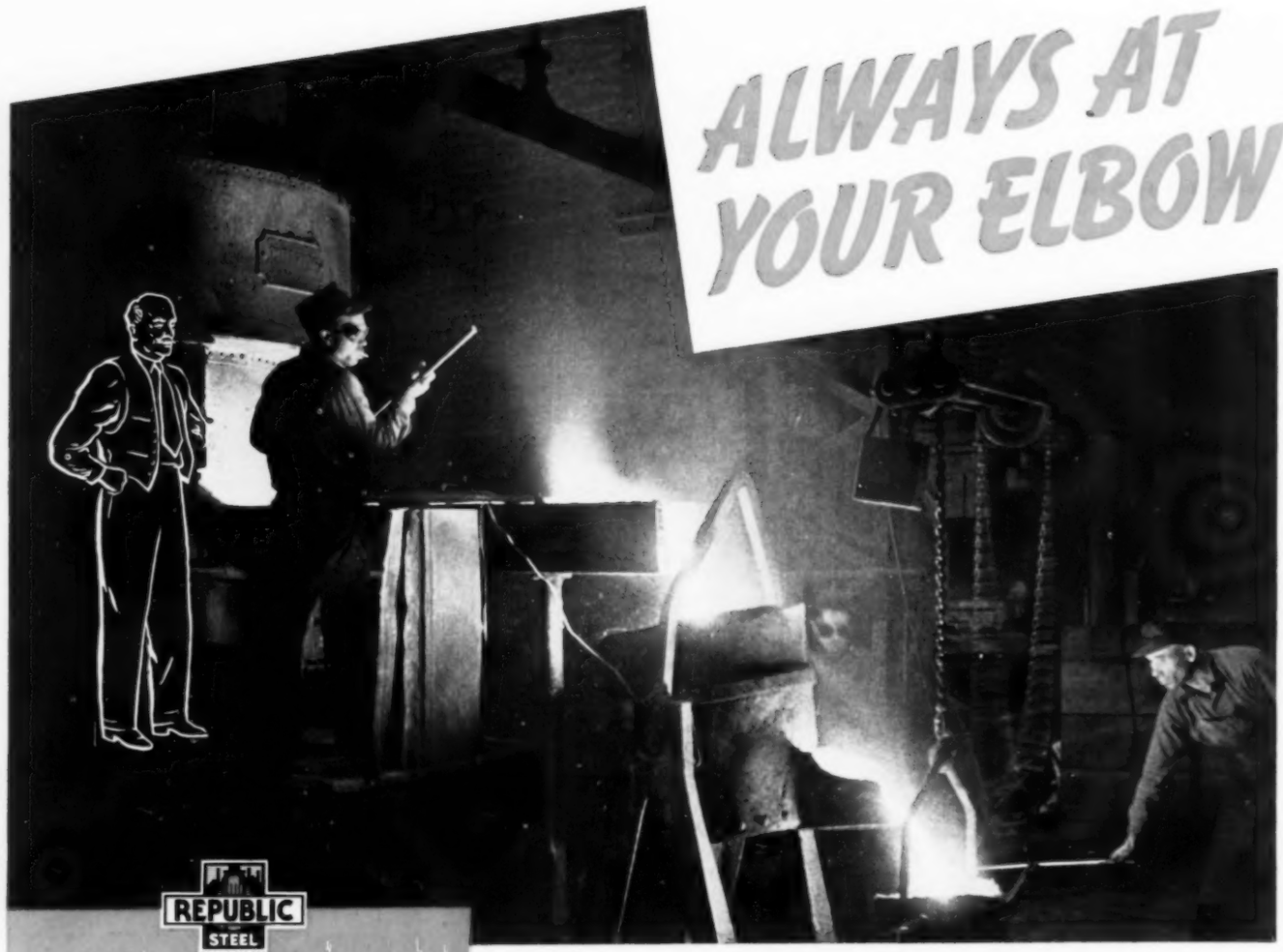

REPUBLIC STEEL

PIG IRON

"REPUBLIC"
(Youngstown, Ohio)
Bessemer and Basic

"PIONEER"
(Birmingham, Ala.)
Foundry and Basic

"McKINNEY"
(Cleveland, Ohio)
Foundry, Malleable and Basic

"NIAGARA"
(Buffalo, N. Y.)
Foundry, Malleable and Basic

● It's the old story of a stitch in time saving nine. When trouble in the form of faulty or poor castings pops up—or when costs take an upward trend—don't wait and hope that the trouble may cure itself. Send for a Republic Pig Iron Metallurgist.

He's a foundry doctor. He knows the symptoms of foundry ailments—knows where to look for them and what to do to correct the trouble.

Remember: the Republic Pig Iron Metallurgist is always at your elbow whenever you need him. Don't lose money by delaying to call him. Republic Steel Corporation, Cleveland, Ohio.

ALWAYS A WINNING TEAM!

Republic Pig Iron, Core Wire and Foundry Nails

* * *

Truscon Foundry Flasks

* * *

Republic Metallurgists

Republic Steel

BERGER MANUFACTURING DIVISION
NILES STEEL PRODUCTS DIVISION
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MORE THAN A MILLION TONS A YEAR OF HIGH QUALITY MERCHANT IRON

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The Foundry Editorial

Courts Must Interpret Many Wage, Hour Law Questions

DIVERSE opinion as to the meaning of various sections of the *Fair Labor Standards Act* of 1938, commonly known as the *Wage and Hour Law*, has resulted in considerable confusion throughout all industry. Members of the legal profession disagree on interpretations as to scope and details of the law, and, of course, many are in disagreement with the numerous "opinions" being handed down by the administrator of the wage and hour division of the department of labor, and his assistants.

As has been pointed out by the hour and wage division on several occasions, the act "does not empower the administrator to issue rulings, including industries or employes within its coverage, or excluding them." Outside of purely administration features, the administrator is limited in his rulings to the following:

1. Records to be kept by the employer covering "persons employed by him and of wages, hours, and other conditions and practices of employment maintained by him."
2. Under what conditions and in what numbers learners, apprentices, messenger boys and handicapped workers may be employed at less than the minimum wages.
3. Whether or not an industry is of a seasonal nature and therefore entitled to partial exemption from the hour provisions of the act.
4. What will be the reasonable cost of board, lodging and other facilities, when these customarily are supplied to the employe as part of his wages.
5. Definition of employes who may be considered in executive, administrative, professional or local retailing capacities, and therefore exempt from the act.
6. Definition of the term "area of production" in the first processing of any agricultural or horticultural commodity during seasonal operation, so that certain exemptions may be applied.

While the administrator and his assistants are trying to be of assistance in giving out opinions concerning the meaning of various sections of the act, the fact remains that industries and employes are included or excluded and other points are determined by the provisions of the act itself, as they will be interpreted by the courts. Therefore, if industry follows the opinions of the administrator, and later the courts rule differently, industry may be in considerable difficulty. In the face of so much uncertainty, industry probably will gain most by complying with a rather strict interpretation of the act until the debatable questions have been passed on by the courts. In other words, be on the safe side.

Organization of an industry committee continues a topic of discussion wherever foundrymen meet. Because THE FOUNDRY believes some of the suggestions will not serve the best interests of castings producers, the two points emphasized in the November issue, are repeated:

All four branches of the foundry industry should be combined under one committee to avoid duplication of effort and confusion.

The foundry industry should not be included in some broad classification, but should be organized as an entity to secure adequate representation for such a large and important group of manufacturers.

Exhibiting the Plant

EACH year more foundries are adopting some plan whereby families of employes, citizens of the community, and in some instances customers of the company, are permitted to inspect the manufacturing facilities. A recent plant inspection or open house of that type is described on page 67 of this issue, and others have been reported in the past.

Much can be accomplished through such an event. Many problems of management arising from employe relationships vanish as the families are permitted to see where Dad works. Employes take particular pride in showing a clean plant, and with proper direction, the good housekeeping tendencies may be continued throughout the year. Community interest and understanding built on a visit to the plant will prove valuable on many occasions. Where the plan is extended to include customers, the plant facilities are exhibited under the most favorable conditions.

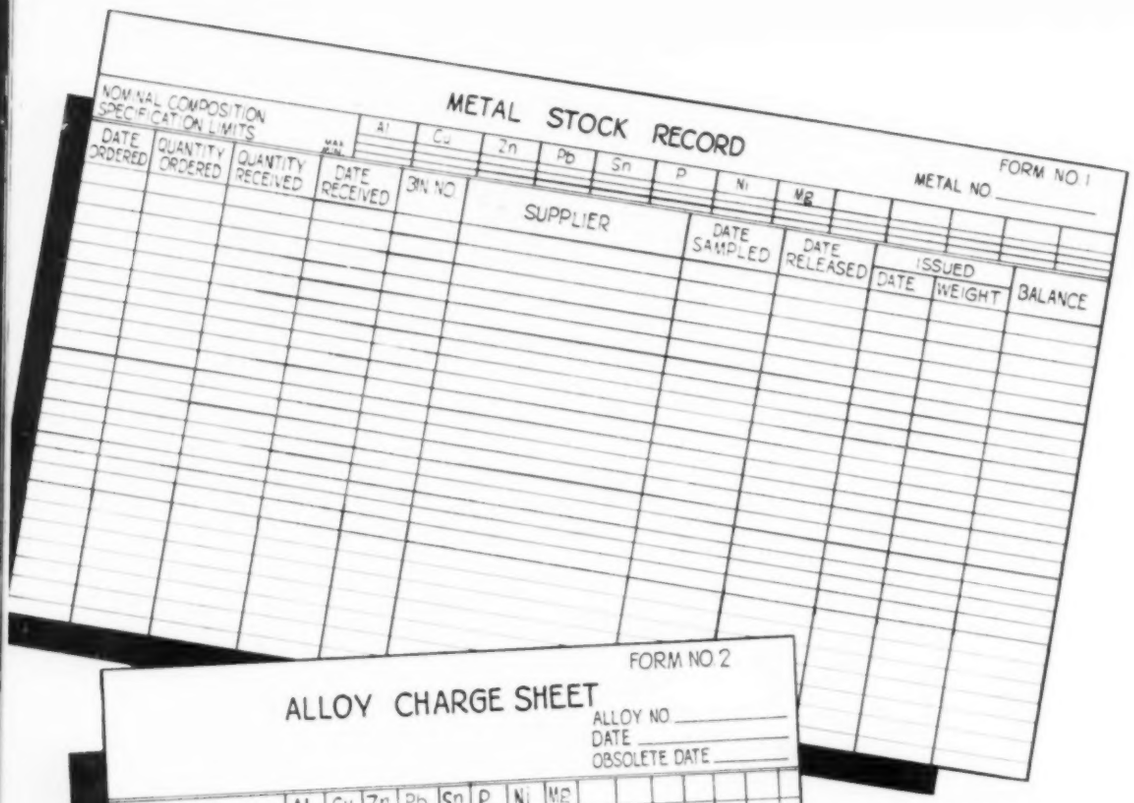
The various companies holding open house are doing a selling job for themselves, and for the entire foundry industry. Congratulations!

AS THE holiday season again approaches, the editorial and business staffs of THE FOUNDRY join in the wish that yours may be a Merry Christmas, and that the New Year will bring health, happiness and prosperity.

Frank G. Steinebach
Editor

Forms

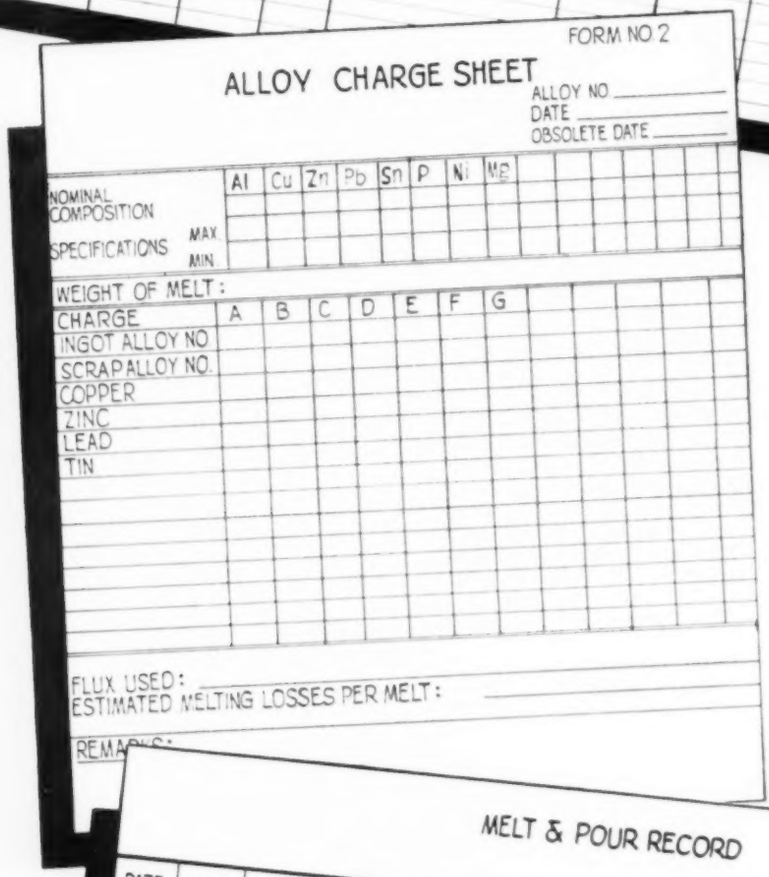
By SAM TOUR
Vice President
Lucius Pitkin, Inc.
New York


METAL STOCK RECORD

FORM NO 1

METAL NO _____

DATE ORDERED	QUANTITY ORDERED	QUANTITY RECEIVED	DATE RECEIVED	B/N NO	SUPPLIER	DATE SAMPLED	DATE RELEASED	ISSUED DATE	ISSUED WEIGHT	BALANCE
NOMINAL COMPOSITION SPECIFICATION LIMITS MAX MIN					Al Cu Zn Pb Sn P Ni Mg					


ALLOY CHARGE SHEET

FORM NO 2

ALLOY NO _____
DATE _____
OBSOLETE DATE _____

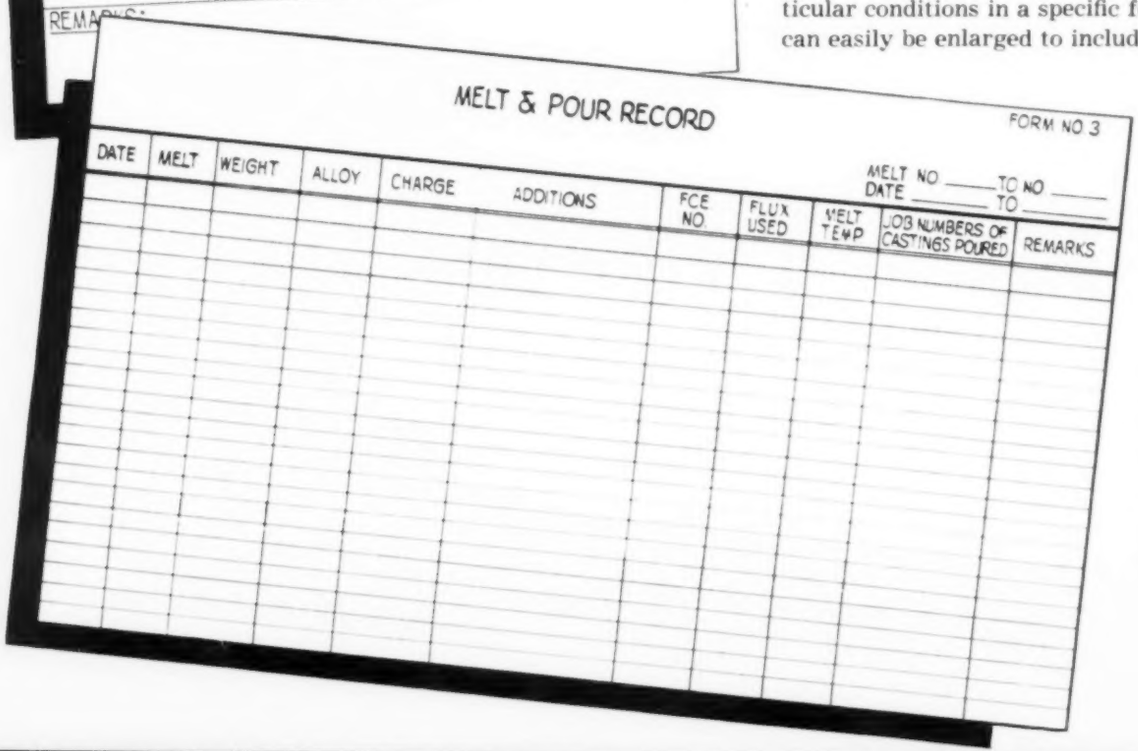
NOMINAL COMPOSITION SPECIFICATIONS MAX MIN	Al	Cu	Zn	Pb	Sn	P	Ni	Mg

WEIGHT OF MELT:

CHARGE	A	B	C	D	E	F	G
INGOT ALLOY NO							
SCRAP ALLOY NO.							
COPPER							
ZINC							
LEAD							
TIN							

FLUX USED: _____
ESTIMATED MELTING LOSSES PER MELT: _____

REMARKS:


MELT & POUR RECORD

FORM NO 3

MELT NO _____ TO NO _____
DATE _____ TO _____

DATE	MELT	WEIGHT	ALLOY	CHARGE	ADDITIONS	FCE NO	FLUX USED	MELT TEMP	JOB NUMBERS OF CASTINGS POURED	REMARKS

FOUNDRY records often are given little if any consideration. In those all too seldom cases where consideration is given, it is too often from the standpoint of bookkeeper, timekeeper, or cost accountant. In such cases, the record work becomes a burden on foundry foreman or superintendent and a record clerk is regarded as a nuisance.

Large production foundries producing only a limited number of different castings but in very large quantities have more need of the cost accountant type of records. The jobbing foundries producing a few of this and a few of that from an ever changing list of hundreds or thousands of patterns have particular need for records of the production aid type.

The system can best be explained by a series of descriptions of a set of record forms. Specific details of any of the forms can be altered to suit particular conditions in a specific foundry. The system can easily be enlarged to include more details, when considered necessary or advisable.

Form No. 1 is for keeping a record of metal on hand. Each alloy is presumably known by some alloy number or code designation. A metal stock record is kept on a separate sheet for each kind of metal on hand. This record form shows the nominal composition and the composition

Provide Adequate Foundry Records

specification limits. This is always an aid to the foundry. All too often the head of the foundry does not have this information readily available, although intelligent operation of a shop requires this knowledge at one's fingertips at all times.

The form also shows the necessary information as to dates, quantities, time of delivery, source of supply, location in stock room and quantity on hand to allow of intelligent control of inventories.

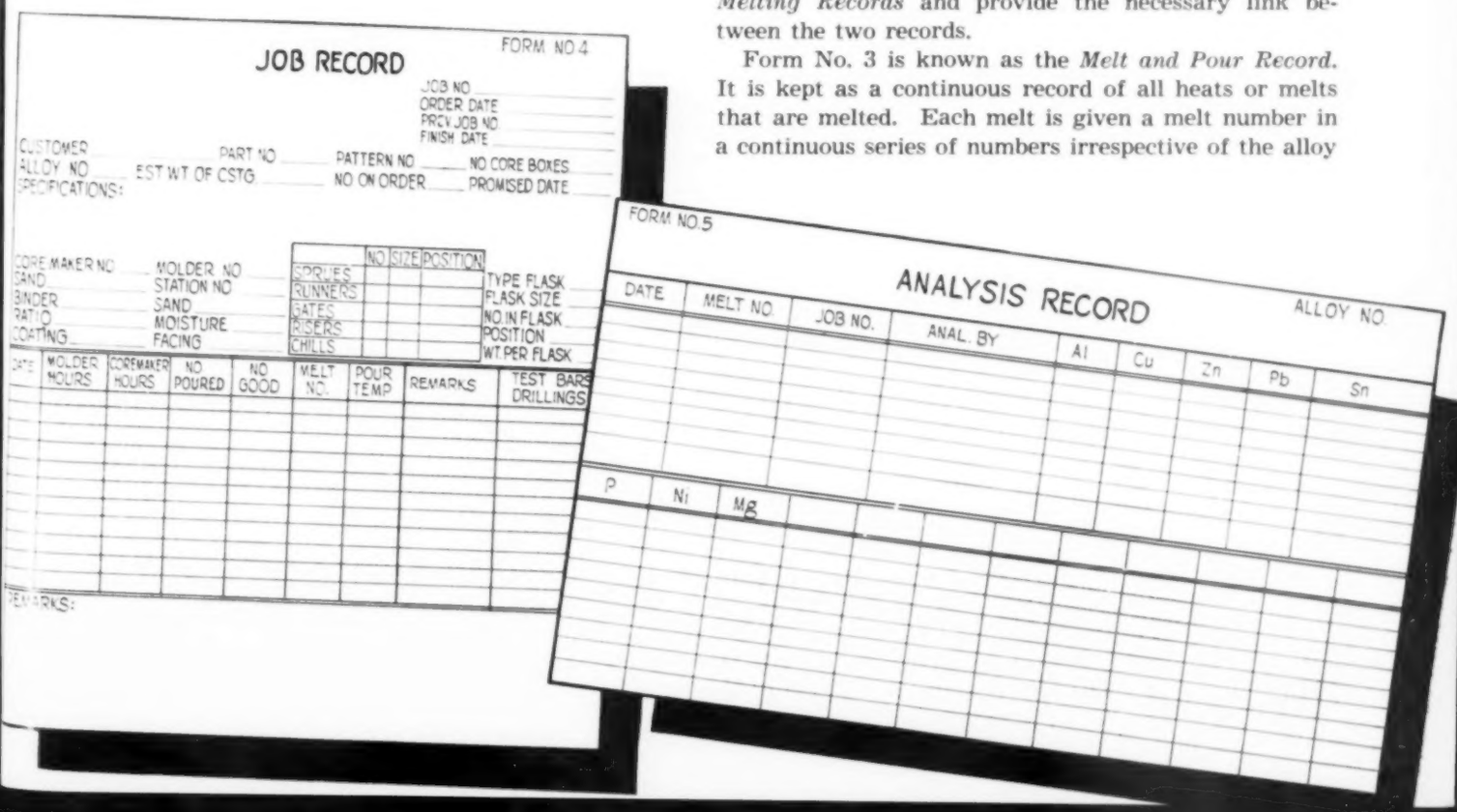
Form No. 2 is known as the *Alloy Charge Sheet* form. It usually is desirable to have a number of different ways available for the making up of a desired alloy. The particular method chosen in a specific case will depend not only on the castings to be made but also on the stock of various metals on hand. Sometimes it is desirable to use all new metals, sometimes all gates, risers, etc. of the same alloy may be desirable, at other times it may be most economical to use up some surplus alloy of different composition mixed with other metals to produce the desired alloy.

Space is thus provided on this form for a record of the nominal composition, the specification limits as to composition of the alloy, and some 10 or 12 different charges or *make ups* to yield the desired results.

It will be noted in the upper right-hand corner of this form that spaces have been provided for *Alloy No., date* and *obsoleted date.* No erasures or changes should ever be made on one of these forms. When some change is to be made, the form in use to that date should be obsoleted as of that date and a new form made out. The obsoleted forms are then kept as a permanent record of the practice followed during the included period between original date and obsoleted date and thus will show what the make-up was of any melt of that alloy made during that period of time.

The various charges or make-ups are known by letters such as *A, B, C,* etc. These letters are used on the *Melting Records* and provide the necessary link between the two records.

Form No. 3 is known as the *Melt and Pour Record.* It is kept as a continuous record of all heats or melts that are melted. Each melt is given a melt number in a continuous series of numbers irrespective of the alloy



being melted. This record shows the date, melt number, weight of melt, the make up or charge letter as described in connection with Form No. 2, the additions made in the melting room, the furnace melted in, etc., and the job numbers of the castings poured.

It is obvious that this record is an important tie between the stock room, the melting room, and the pouring floor and is a permanent record of practice followed each day on each alloy on each job.

Form No. 4 is known as the *Job Record* form. It is based upon the assumption that every order received by the foundry has a job number or order number assigned to it. This is usual practice in all foundries.

The form provides spaces for a notation as to previous job numbers for the same casting so that the record of the previous run can be located readily and all details regarding the previous run can then be reviewed before starting the new run.

Below the usual information supplied on the order itself, a space is provided for the noting of any special specifications such as stamping of melt numbers, pouring of test bars or coupons, physical requirements, pressure tests, etc., etc.

Spaces are provided for information as to the details of production such as which core maker is assigned the work, what sand is used, what binder is used, ratio of sand to binder, coating used on cores, which molder is assigned the work, his station or tub number, bench number or floor station, the grade of molding sand used, moisture content and facing. In addition, spaces are provided for brief notes as to sprues, runners, gates, etc., as to type of flask, number in flask, position of mold in pouring, and weight cast per flask.

FORM NO.6 TEST RECORD ALLOY NO

DATE	MELT NO.	JOB NO.	TEST BY	Y.S PSI	T.S PSI	ELONGATION	HARDNESS	REMARKS

Space is provided for the actual day to day record of the progress of the job. Finally, space is provided for *remarks*. These remarks should include descriptions of any variations tried and results gained by them.

The form can be printed on two sides of a card if desired. In such an arrangement, the day to day record may be carried through to the back of the card and the last 2 inches on the back of the card provided for remarks, or the space for remarks is kept on the front of the card and the entire back of the card is used for the day to day record.

It will be noted that this record form follows in natural sequence after the previous record form on melting and pouring and covers the disposition of the metal poured from each melt.

Form No. 5 is for a record of chemical analyses as they are made from time to time on the various metals and alloys. The value of chemical analyses is great. Properly recorded and arranged for quick and ready reference, their value becomes even greater still.

Every good foundry should know how its metal is running in composition. How it ran a year ago, and how it differs today is often the answer to new problems as they develop. Analyses often are received from various sources and on various forms of reports. The figures may easily become lost in a mass of loose unclassified papers. When jotted down on a permanent record form as here provided, they become very useful information.

A small 4 x 6-inch card will be found quite satisfactory for this form. It can be printed on both sides if desired. The spaces provided for on the form need no explanation.

Form No. 6 is for a record of physical tests as they are made from time to time. The same remarks apply to this record and the form for it as have just been made for the *Analysis Record*, Form No. 5.

Having thus described and presented the various basic forms required for an adequate foundry record, it might be well to touch briefly on the other duties and functions which might be performed by the foundry record clerk.

This will, of course, depend to some extent upon the size of the foundry and the number and kind of jobs going through the foundry, but most of all it will depend upon the man himself. Is he just a clerk? How much work *will* he do other than clerical? How much work *can* he do other than clerical? Can he reason from cause to effect? In short, how good a man is he? A good man in this position will quickly become a great asset.

As the foundry record clerk must record the various items of information, he is often the logical man to make the observations necessary to obtain the information. If the volume of work is so great that the man cannot personally make the observations, then the observers should be under his direction. For example, the weighing in of metal, the sampling of metal received, the weighing out of charges for the melts, the taking of temperatures of (*Please turn to page* 80)

N.F.A. Program Features Management Problems

Franklin R. Hoadley
President

W. D. Hammerstadt
Vice President

A. E. McClintock
Commissioner

J. M. Taylor
Secretary-Treasurer

FOUNDRY management problems, labor relationships and industrial training, featured the 42nd annual convention of the National Founders' association held Nov. 16 and 17 in the Waldorf-Astoria hotel, New York. All sections of the country were represented in the attendance.

President Franklin R. Hoadley in the opening address paid tribute to the spirit of resourcefulness and willingness to cooperate shown by the American people after the recent hurricane disaster in New England. Under the stress of tragic conditions old fashioned co-operation seemed to come from everywhere and nowhere. The speaker stated that the utmost credit must be given to labor for the part it played in meeting the emergency.

American People Going Forward

Inventiveness, resourcefulness and ingenuity of the American people cannot be stifled by agricultural acts, labor boards or labor unions, Mr. Hoadley declared. Back of all, is an inheritance which cannot be stamped out. Supporting all is the everlasting willingness of the average American to take a chance on the product of his own brain child. A nation that still will take a chance to have something new convinces Mr. Hoadley that after a few more economic chickens, the result of governmental planning, have come to roost, the American people will go forward again and make use of their unparalleled resources.

"Just tell me," he stated in conclusion, "when we are going to remove the restrictions which prevent close co-operation between management and employes; when we are going to stop putting shackles on production; when we are to be sure of a sound currency; when our government expenditures are going to be brought into line with government income, based on a fair tax burden, and I will tell you when this country of ours will enter the greatest period of prosperity it has ever known."

The foundry industry has been more fortunate than many others in its industrial relations, A. E. McClintock, association commissioner, stated in his annual report. In spite of unrest and of legislative restrictions there has been a growing tendency on the part of workmen to work out their troubles with management in their own way. He claims that as business continues upward the conservative labor faction will assert itself, and that foundrymen should build upon this trend by keeping their houses in order. They should see that the best possible working conditions are maintained, that wage rates are fair and equitable and that nothing over which they have control leads to petty grievances, which in turn lead to greater trouble.

Scarcity of Skilled Mechanics

Commissioner McClintock warned foundrymen against the possibility of another scarcity of skilled mechanics as business continues upward. The lack of apprentice training during the years of depression still is evident, and the past year was another setback. The age limit of the skilled molder is continually rising. Foundrymen seeking foremen and superintendents the past year or two realize how difficult it is to get a qualified, experienced man who is not considerably along in years.

Assuming a continuance of peace and a system allowing free enterprise, the outlook for business just ahead, 6 to 9 months, is reasonably encouraging for the retention of recent moderate gains, in the opinion of W. W. Cumberland, economist, Wellington & Co., New York. Beyond that comparatively brief period, potential uncertainty remains too great for a definite prediction.

The American plant in numerous instances is obsolete (*Please turn to page* 84)

This is the first part of a paper by A. P. Lee, Bethlehem Steel Co., presented before a meeting of the Connecticut Foundrymen's association at Meriden, Conn. The second and concluding part will appear in an early issue of The Foundry.

FOUNDRYMEN in recent years have been concentrating on production of better irons; irons of lower carbon content, and frequently containing alloys, with greater strength, uniform density, better wear resistance, and with machinability not too far out of line compared with those formerly made. During the time of this development many new problems were encountered and old difficulties aggravated. Because of this some foundrymen became discouraged and lost interest, while others compromised by making a less desirable metal.

Recently a change seems to have taken place. A great number of foundrymen now have decided that the low carbon irons have a large field, and that the better plan is to make the irons needed and then develop a practice that will overcome the difficulties encountered. In recent months, when groups of foundrymen have come together, their meetings have been devoted mainly to the discussion of how to use the low carbon irons, rather than how to make them. All have seemed to think that they knew the latter pretty well. However, they have some doubts whether their shop practice and supervision are sufficiently efficient.

Castings Come Back To Iron Foundry

There seems to be no question that the low carbon irons are worth all the effort required to make and use them. It is difficult to get accurate production figures. According to one reliable source of information the 1936 output of alloyed gray iron castings was about 2,000,000 tons. Due to the higher strength and other desirable properties of these castings more and more jobs are coming back to the iron foundries.

It will be a great help to approach these irons, and the problems encountered in their use, somewhat in the manner of the steel foundryman. When the steel casting industry was in its infancy it was soon discovered that gray iron practice was not applicable to steel. A new practice had to be developed. The steel foundryman still is faced with problems that draw heavily on his experience, skill, and ingenuity. Gray iron foundrymen should not be unduly concerned when they find that their old methods do not quite fill the bill.

Castings should not be made with a lower carbon than is necessary to produce the desired results. In selecting the carbon content for a specific job several factors must be taken into consideration. Most important among these are the design, thickness of section, use to which the casting will be put, strength desired, and machinability. A turbine casting may require an iron with 2.75 per cent total carbon while a piece of hardware calls for 3.50 per cent. The difference of 0.75 per cent represents a wide range in physical properties. An intelligent utilization of alloys and other constituents also is important. A casting with 2.50 per cent silicon and 3.00 per cent total carbon when used in a 4-inch section differs greatly in physical properties from a 1-inch section. This is due to the effect which the retarded cooling has on the grain size. As the total carbon is reduced the freezing point becomes higher, making the iron somewhat less fluid.

Other factors such as gates, risers, and head pressure, are important in dealing with these irons. In this presentation no mention will be made of melting practice. The assumption is that the metal is satisfactory and the discussion therefore will be confined to its proper use. Neither will any reference be made to sand, molding, and core making. Foundrymen are aware of the troubles caused by neglect of any of these

SHOP

Problems In Low Carbon Iron

By A. P. LEE
Bethlehem Steel Co., Bethlehem, Pa.

factors. It is sufficient to state that everything must be done more thoroughly and with greater care in working with low carbon irons. Because the freezing point is higher and the iron less fluid, even slight disturbances in the molds are more serious. As one foundryman expressed it, he no longer can run his troubles out of the flow-off.

Defects blamed on the metal often are caused by a slight boil, kick from a core, hard ramming, close sand, wet sand, or insufficient venting. Gas and steam resulting from such disturbances cannot get through the metal on account of the decreased fluidity. Consequently they may lodge anywhere, usually in a heavy area adjacent to a lighter section which has set more quickly. Often these defects look like shrinkage.

The proper time to talk about gates is when the pattern, blue print, or match, is on hand, because no one prescription will apply to all cases. Even though every job is a problem there are some factors worthy of special mention as they apply to almost every case.

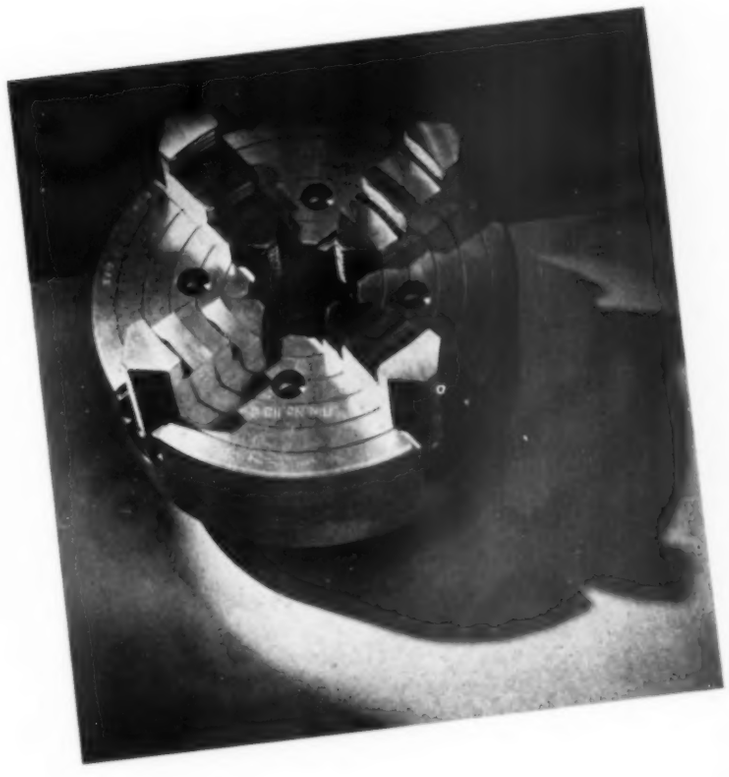
Dry sand runner boxes, gate cores, and cleaner gates now are used more extensively. If used in green sand the draw gate is safer and cleaner when made in core. Considerable trouble may result from the use of draw gates on a skin dried job or one which is supposed to be fired on the floor and dried to a depth of 1 or 2 inches. During drying the steam works off through the gates, so that the sand in that area becomes too moist to stand up against the metal without cutting. Sufficient heat cannot get back into the gates to compensate for the extra moisture. A draw gate which is not dry is not a clean, safe gate.

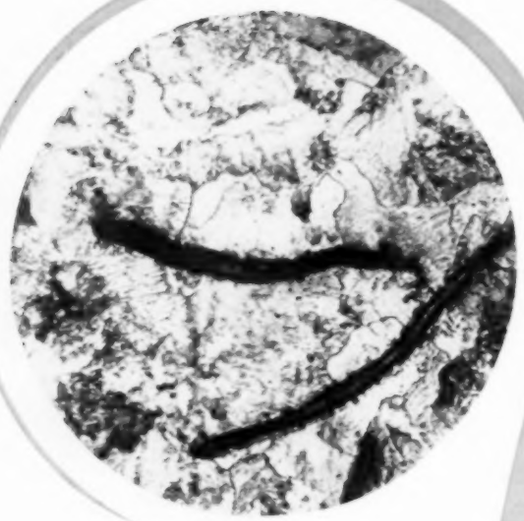
Horn gates are not used as much as formerly because fewer cast tooth gears and pinions are made today. When carefully made and intelligently used this gate can be classed as good for certain types of work.

Gates Made in Refractory Material

The fountain gate is another of the bottom type. Due to design and method of application it usually is well made and clean. On large work this gate often is made of fire brick material. This also is true of draw gates, vertical and horizontal. These refractory gates are not expensive. Four sets for a large bed casting cost about $1.50. They have proved successful for heavy machine tool and marine engine castings and are recommended to anyone who desires a fool proof gate which will stand up against any amount of metal. They are made to any design, round, vertical, horizontal, in various sizes, and are all interchangeable.

All of the three bottom type gates referred to have their places. However, it must be kept in mind, that low carbon irons cannot be pushed successfully from the bottom as far as is possible with high carbon irons. Here again the (*Please turn to page* 72)





Producer

This is first article of a series of two relating to an investigation conducted by the authors on the effect of molybdenum on super cast irons. The second and concluding article will appear in an early issue.

ALTHOUGH production of cast irons with tensile strength in excess of 60,000 pounds per square inch remains largely in the experimental stage, many engineers, metallurgists and foundrymen confidently predict that these super cast irons, so-called, will extend greatly the uses of high-strength, 50,000 to 60,000 pounds per square inch irons which are today replacing materials produced by other methods of manufacture for such applications as crankshafts, camshafts, gears, turbine casings, rollers, bushings, oil well machinery, drawing dies, steam turbine cylinders, locomotive cylinders and locomotive driving axle boxes.

Commercial production of cast iron in excess of 50,000 pounds per square inch has been perhaps the most newsworthy achievement of the foundry industry in recent years and the present interest in the subject may be enhanced greatly when it generally becomes recognized that such irons offer an opportunity for increased tonnage within the reach of the ma-

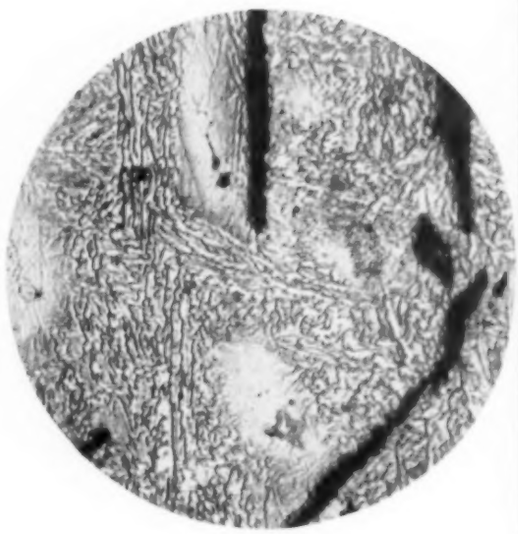


Fig. 1 (Upper left)—Heat No. 1299, etched in 2 per cent nital, 500 diameters, 1.2-inch section. Fig. 2 (Center)—Heat No. 1299, etched in 2 per cent nital, 500 diameters, 2-inch section. Fig. 3 (Above)—Heat No. 1266, etched in 2 per cent nital, 500 diameters, 1.2-inch section

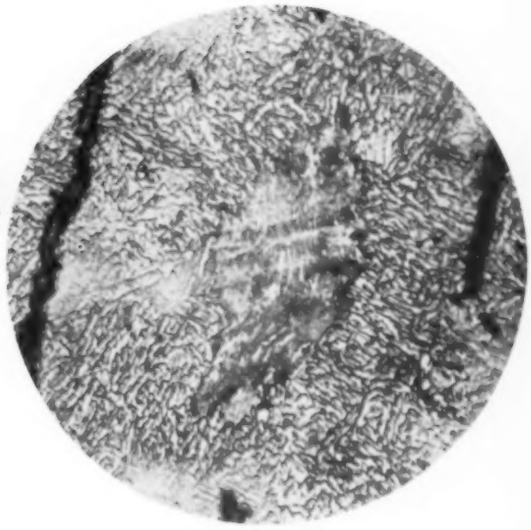
Table I

Data on Heats Forming Group A

Heat No.	1228	1229	1230	1231
Chemical analysis				
Total Carbon	2.62	2.57	2.59	2.90
Combined Carbon	0.60	0.64	0.69	0.67
Graphitic Carbon	2.02	1.93	1.90	2.23
Manganese	1.11	1.10	1.07	1.58
Silicon	2.50	2.44	2.45	2.52
Molybdenum	1.00	1.02	1.02	1.51
Nickel	1.05	1.03	1.03	.....
Chromium	.....	0.21	.....	.....
Vanadium	.....	.....	0.11	0.06
Superheating temperature, degrees Fahr.	2800	2800	2800	2800
Pouring temperature, degrees Fahr.	2650	2650	2650	2650
Physical properties				
1.2 inch Section				
Brinell Hardness	325	461	335	341
Transverse Test				
Load in pounds	3,365	2,990	3,680	4,025
Deflection in inches	0.241	0.194	0.273	0.354
Tensile strength, p.s.i.	52,450	.....	67,000	74,750
Impact, ft. lbs.	35	26.5	43.4	50.0
2-inch Section				
Brinell Hardness	293	331	311	302
Transverse Test				
Load in pounds	12,000	13,120	13,425	13,700
Deflection in inches	0.227	0.242	0.248	0.291
Tensile Strength, p.s.i.	59,450	69,100	69,550	72,600
Impact, ft. lbs.	46.9	59.2	70.6	71.1

High Strength Iron

By G. A. TIMMONS, V. A. CROSBY, and A. J. HERZIG
Climax Molybdenum Co., Detroit



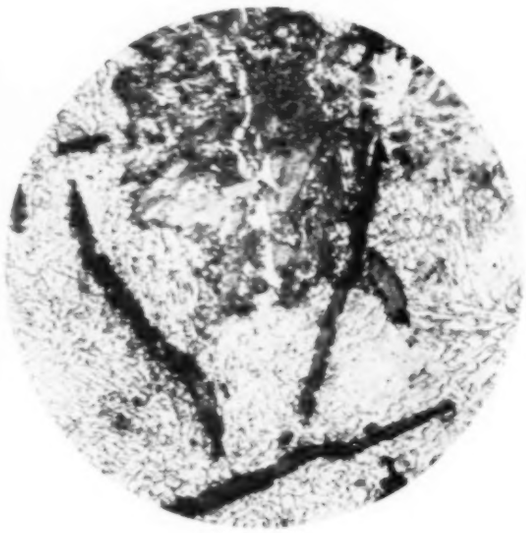


Fig. 4 (Above)—Heat No. 266, etched in 2 per cent nital, 500 diameters, 2-inch section. Fig. 5 (Center)—Heat No. 1265, etched in 2 per cent nital, 500 diameters, 1.2-inch section. Fig. 6 (Upper right)—Heat No. 1265, etched in 2 per cent nital, 500 diameters, 2-inch section

jority of foundries. In this respect, it will be recalled that foundries producing cast iron exclusively in recent years have looked upon these new, high strength materials as perhaps the best available means for broadening the market for their products.

High strength cast irons may be substituted for forged and other steels on the basis that cost of production can be reduced; greater flexibility in engineering design may be obtained due to the fact that shapes which could not be readily forged may be cast; and some of the special properties of cast iron, such as wear resistance and greater damping capacity give increased life to the cast part.

From the standpoint of financial outlay by the producer, there is considerable advantage in favor of the casting process. The investment in patterns is almost invariably less than die costs. In the event that design changes later are found necessary, pattern alterations are readily accomplished whereas changes in dies

Table II

Data on Heats Forming Group B

Heat No.	1265	1266	1267	1268
Chemical Analysis				
Total Carbon	2.49	2.50	2.50	2.55
Combined Carbon	0.66	0.65	0.61	0.63
Graphitic Carbon	1.83	1.85	1.89	1.92
Manganese	0.97	0.99	0.98	1.00
Silicon	2.71	2.80	2.73	2.70
Molybdenum	1.03	1.04	1.03	1.05
Nickel	1.01	.....	1.02	1.00
Superheating Temperature, degrees Fahr.	2700	2700	2700	2700
Pouring Temperature, degrees Fahr.	2650	2650	2650	2650
Physical Properties				
1.2-inch Section				
Brinell Hardness	331	302	321	302
Transverse Test				
Load in pounds	5,440	4,510	4,340	4,774
Deflection in inches	0.570	0.415	0.382	0.478
Tensile Strength, p.s.i.	80,500	74,100	82,280	85,800
Impact Strength, ft.-lbs.	106.9	118.1	114.7	115.8
2-inch Section				
Brinell Hardness	302	286	302	293
Transverse Test				
Load in pounds	16,800	17,100	16,200	15,600
Deflection in inches	0.470	0.455	0.439	0.428
Tensile Strength, p.s.i.	65,550	74,800	76,550	68,200
Impact Strength, ft. lbs.	120+	113.1	120+	120+

(See Fig. 1 for relative chilling tendencies of these irons).

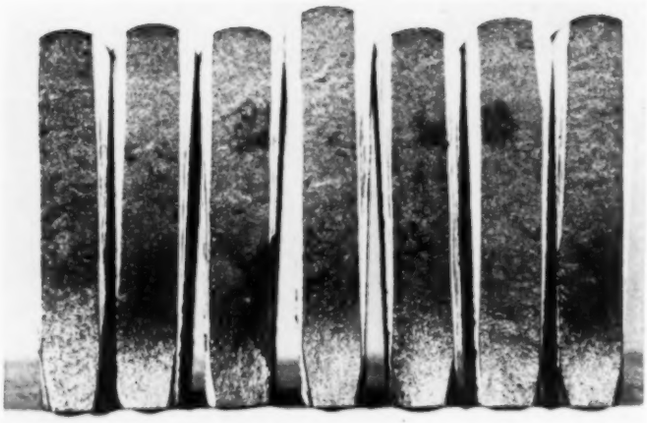


Fig. 7—Relative chilling tendencies of heats No. 1299, 1300, 1301, 1302, 1303, 1304 and 1305 from left to right respectively

may be difficult, if not impossible. Obviously, expensive forging equipment is not required to produce cast irons and expensive heat treating furnaces are usually not essential.

From the point of view of engineering design, high strength cast iron possesses important advantages over forgings. A considerable amount of unnecessary weight may be eliminated, making for greater efficiency of the part. An outstanding example is a diesel engine crankshaft in which the coring of crankpins alone resulted in a net saving of 30 per cent in the weight of the unit. Such substantial savings in material may be a controlling factor where it becomes imperative to reduce weight. Another important consideration in favor of castings is the well-known metallurgical fact that shapes quite inconsistent with forging operations may be cast readily.

Superior qualities of the newly developed material as compared with the best cast iron produced a few years ago are well established. Improvements in the properties of cast iron as a result of the use of alloys, better control of melting operations, improved molding conditions and better technical control in the foundry have taken much of the guess work out of the casting process and made possible more uniform and dependable production.

Although such characteristics as improved wear resistance, greater torsional and fatigue strengths (at a given tensile strength, and increased damping capacity are often strong arguments in favor of cast iron, space limitations will not permit discussion of such properties in this article. Rather, it will be shown that on a basis of properties determined in the laboratory, such as tensile and transverse strength, deflection and toughness (which are in some measure indicative of the characteristics mentioned previously), the older 50,000 to 60,000 pounds per square inch do not represent the ultimate obtainable by the modern foundryman.

Develop High Strength Iron

There are three considerations which must be taken into account when it is desired to develop a cast iron with strength in excess of 60,000 pounds per square inch:

1—Adjustment of the C-Si ratio to produce an iron containing low graphitic carbon without producing ferrite or carbide.

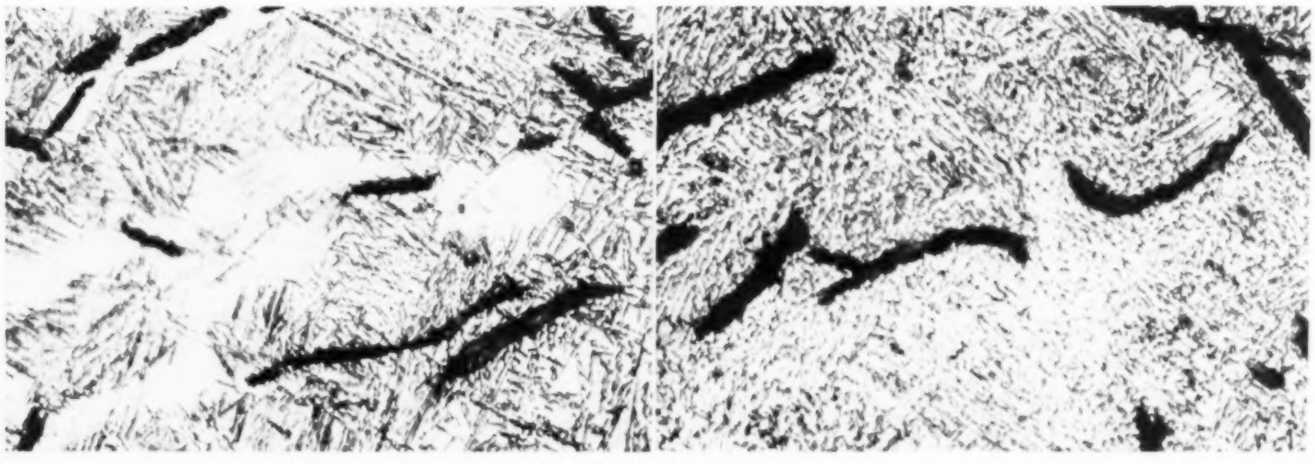
2—Employment of late additions of graphitizers to control graphite distribution, flake size, and shape.

3—Introduction of alloys to (a) further assist in balancing the iron; (b) strengthen the matrix through solid solution effect, and (c) control the rate of the transformation reaction.

In the present study, each of those methods has been employed in an effort to develop a structure composed of uniformly distributed graphite flakes in an acicular matrix—a structure shown by experience to be necessary to produce high tensile strength, high impact resistance, and exceptional wearing properties combined with good machinability. A detailed description of the procedure followed and the results obtained will be given following a few brief comments on the three approaches (mentioned previously) to the problem of developing cast iron with tensile strength in excess of 60,000 pounds per square inch.

A. Lower Carbon, Higher Silicon Contents—It has been shown by Boegehold in *Transactions* of the American Foundrymen's association, 1937, page 599, that lower total carbon contents result in irons of greater strength-hardness ratio. (*Please turn to page* 75)

Fig. 8—Heat No. 1305, etched in 2 per cent nital, 500 diameters, 1.2-inch section. Fig. 9—Heat No. 1305, etched in 2 per cent nital, 500 diameters, 2-inch section



Among Detroit Foundries

Tapping a 3-ton Heroult electric furnace at plant of Michigan Steel Casting Co., Detroit, the heat being carbon steel for casting

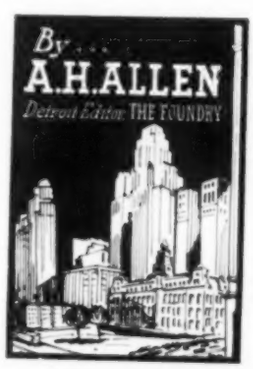
ACTIVITY in automobile foundries is at fever pitch and melting capacity is being pushed for all it is worth to fill the incessant demands from machining departments for more castings. Almost without exception the integrated or captive automotive casting shops are at peak and in some cases new tonnage records are being achieved.

The situation is traceable to the unexpected enthusiasm with which new models have been greeted by the buying public. Sales executives are rubbing their eyes to make sure they are not dreaming the piles of orders for cars which are being whisked into plants from dealers and distributors. The order backlog is so large that it is estimated automobile production—now about 100,000 cars and trucks weekly—could continue at the present rate for another 3 months without overstocking dealers.

With production foundries humming to meet demands of assembly lines, it is natural that some overflow castings requirements must be fed to independent melters. Foundries equipped to supply such parts also are stepping up operations currently. Elsewhere the foundry picture is not so bright. Many shops in this area now are either inoperative or working on sharply reduced schedules.

However, even for the latter group the outlook is distinctly brighter, especially in view of recent election results. The business boom which now appears to be in the making undoubtedly will spread within a few months.

Hustling to get out production material, many new equipment programs have been forced to mark time, and may continue to do so until after the first of the year. Foundry equipment interests, with perhaps pardonable dismay, point to the fact that in bad times their customers complain of not having sufficient money to spend on equipment and in good times are too rushed to stop and consider new proposals. This is not to infer that the equipment people are idle, but is just one of the many problems which they must seek ways and means to circumvent.



A foundry in this district has installed a cast iron lining to protect cupola refractories below the charging door. The wear and tear on refractories occasioned by impact with sharp and bulky pieces of scrap is severe. To overcome this destructive action, the foundry has devised U-shaped cast iron shells, comprising top, inside face and bottom, laid up in courses similar to firebrick between charging door and melting zone. The shells are backed with fireclay. The inside of the cupola lining in this area presents a hard, impervious surface capable of withstanding the collisions with pieces of scrap. The heat at this point in the cupola is not sufficient to melt the iron shells. It is claimed that the idea has proved most effective in prolonging the life of the lining. The plant casts its own shells with the inside face formed with the proper curvature to fit the circumference of the cupola.

Some interesting new developments have been made in cast valve tappets. One produced in a western Michigan foundry, is a new type of solid cast iron tappet for Chevrolet which subsequently is drilled out and a spherical seat cut for the pushrod.

Many cars cur- (*Please turn to page* 82)

Small Plant Addition Increases Capacity

RECENTLY the Link-Belt Co. was faced with the necessity of increasing the capacity of its Chicago foundry on Pershing road. The move presented several knotty problems, due to limitation of available space adjoining the existing foundry. High property value of nearby sites discouraged the building of another plant.

The problem finally was solved by a relatively small addition to the width of the old foundry and the ingenious location of molding, coremaking and sand-handling facilities within the extra space so provided.

No small part of the problem involved in this move arose from the fact that output of the plant is widely diversified as to size and type of castings. Essentially a jobbing type of foundry castings range from about 1 pound to 10,000 pounds in weight and include steel, ordinary gray iron, high-test iron and chilled iron castings. Most of the output is employed in the manufacture of various types of materials handling equipment, and includes a large number of hubs, sprocket wheels and gears.

The new plant extension while adding only 17 feet to the width of the structure, permitted the building of a

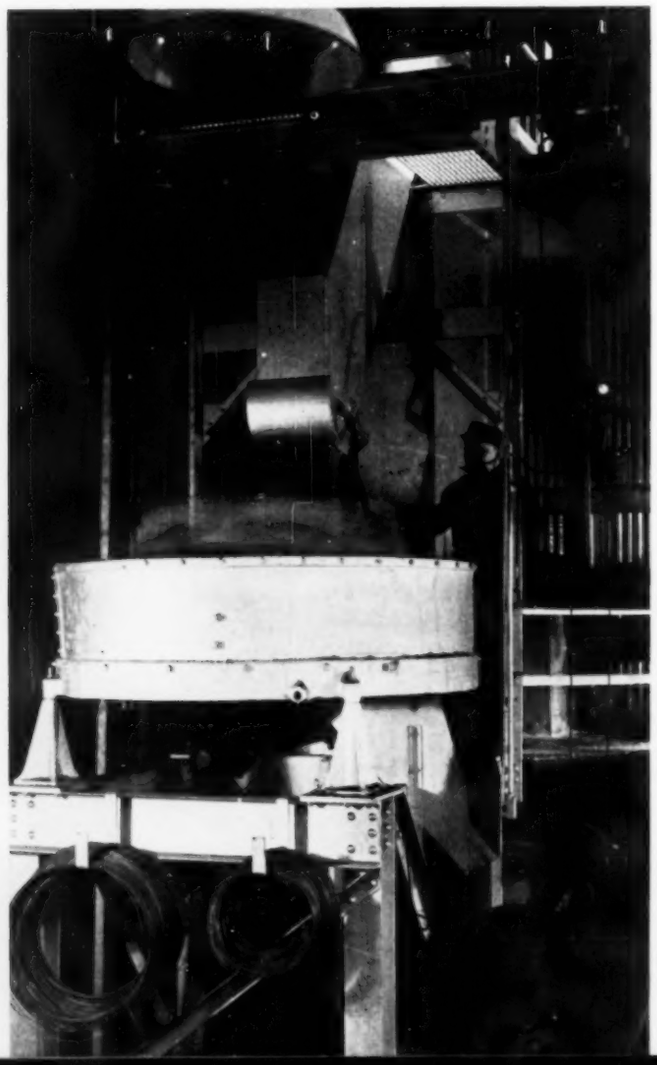


Fig. 1 (Left)—Core sand preparation unit serving first and second floors. Centrifugal-discharge, bucket-elevator delivers through hopper and gate to sand muller. Fig. 2 (Below)—Core bench line on mezzanine floor. Fig. 3 (Right)—Gray iron, snap-mold squeezer line on mezzanine floor. A 20-inch wide distributing belt conveyor serves 36 cubic feet capacity molders' hoppers. Fig. 4 (Extreme right)—Automatic mold storage conveyor on mezzanine floor. A 4-tier unit with 77 trays, 18 inches wide and 10 feet long. Storage capacity is 500 molds, 14 x 18 inches

By W. G. GUDE

40 Per Cent

mezzanine floor in the new section. With the added ground area this increased total floor space about 40 per cent. Redesign of the roof in connection with the extension resulted in marked illumination improvement throughout the building. Installation of the new roof was accomplished without shutting down the plant and resulted in the loss of only a few castings when inclement weather hampered operations.

Exhaust fans located in the skylight help to remove dust and fumes. A new and modern washroom containing 18 shower baths, is situated on one end of the mezzanine. The room is provided with forced ventilation.

Most of the mezzanine floor is devoted to the production of light gray iron and chilled iron castings. This floor is served by a coremaking department located on an extension of the mezzanine across the far end of the building.

The core sand muller is started about an hour before the coremakers go to work to provide time for distribution of the core sand to the benches. Sand is handled in buckets by monorail conveyor to bench hoppers of special design. A movable tray in the bottom permits the coremaker to distribute the sand to the desired spot on his bench. An individual air hose is provided for the use of each coremaker. The department is equipped with four gas-fired core ovens. Sand from this floor also is used in making larger cores in another department on the ground floor directly below and is transferred there through a chute.

Eighteen molding machines located along the mezzanine floor wall are served by individual overhead sand hoppers. Flasks are stacked on shelves placed between the hoppers, where they are readily accessible to the molders. At present finished molds are moved by hand to the adjacent pouring floor, but it is planned to install gravity roller conveyors for each molding unit.

A mold stacker receives molds from three of the machines. This unit, as its name implies, has a number of trays on which the molds are stacked. When a tray is filled, a motor driven mechanism moves it forward and brings an empty tray into position. Loaded trays move to the opposite side of the stacker where the molds are poured. Prior to pouring, weights are placed on top of the molds mechanically. The weights remain in position for a short time after pouring. Then they are lifted and are ready to be used on the next tray of molds as it comes into place. The stacker, with a capacity of 513 molds, not only saves floor space but also a large amount of manual handling of the molds. Five more stackers, eventually are to be installed.

Metal Lifted To Mezzanine Floor

While the mezzanine floor is served by an elevator, hot metal is lifted by crane. Metal from cupolas on the opposite side of the foundry is poured into an insulated ladle and transported by crane in the main bay to a hinged support where the ladle is transferred to a 5-ton hoist located on the mezzanine floor. A hatchway permits the metal to be raised to pouring floor. While the ladle is being lifted, a red blinker light is operated as a warning signal. An automatic cutout switch prevents a smaller crane operating on the floor below approaching the hatchway and thus removes danger of any accident to men in the vicinity.

Molds are shaken out through a grating extending most of the length of the mezzanine. Sand returns by belt conveyor to the conditioning equipment.

In connection with the re- (*Please turn to page* 78)

Brass For Pressure Castings

By N. K. B. PATCH

MANY foundrymen today are using certain alloys or compositions which were developed many years ago and have not had the consideration of those versed in modern metallurgy to see whether or not improvement is possible. Yet, modern engineering is developing new requirements for materials every day. Newer steels have characteristics that are so different from those of a generation ago that where these steels are used as shafts to mate with bronze bearings, or as worms to mate with worm gears, or as spur gears to mate with bronze spur gears, or any other applications where these steels have to mate with bronze, new bronzes are required or the new application of old types of bronzes becomes necessary.

Demand Pressure Type Castings

Another type of development that has taken place in recent years is the increased demand for pressure type castings, or for castings that will come out of the mold with a surface that requires a minimum amount of attention before receiving the plate so that the resulting plated product may have the best and most lasting finish.

Modern metallurgy also has been forced to develop alloys or variations of alloys that may be machined more rapidly or give less trouble in thread cutting machines. Therefore, it is apparent that those who are today manufacturing nonferrous castings must find the story of modern metallurgy extremely interesting and valuable. With that thought in mind, some of the interesting facts, known to many metallurgists that may have escaped the attention of some foundrymen, are outlined in the following brief presentation.

It is not so long since all manufacturers of plumber supplies were using a yellow brass for faucets, bibbs and the like, believed that they were securing a cheap alloy which would mean low cost and, consequently more opportunity to sell their product in competition with others. Because an alloy like 71 per cent copper, 2 per cent tin, 3 per cent lead and 24 per cent zinc is relatively cheap, it does not necessarily mean that the resulting product is going to be low cost and, therefore, capable of more profit. Modern metallurgy has made it clear that use of a slightly more expensive alloy for castings may result in savings elsewhere that make the final cost even lower.

Manufacturers Use Leaded Red Brass

Consequently many plumbers' goods manufacturers now are using a leaded red brass from which to make plated goods. Many call this semired brass instead of red brass. However, the distinction is simply one of name rather than of material. Such an alloy as 78 per cent copper, 2 per cent tin, 10 per cent lead and 10 per cent zinc represents the type of red or semired brass that is being used for some of this work. It is well to note that the compositions mentioned are simply representative of types and not listed as precisely the composition in vogue in the industries described. This is true because each individual manufacturer has, through experiment, developed an alloy he prefers.

One of the interesting improvements to be secured by the use of these red metals instead of the yellow brasses is the reduction of the smoke nuisance in the foundry, and the consequent improvement in physical comfort to the foundry worker.

The previously mentioned compositions are not the only ones to be used. Each of the compositions may be varied widely. An increase in tin content tends to harden the resulting alloy, a reduction in the lead tends to affect the hardness in a minor degree, an increase in the zinc changes the color more toward the yellow and away from the red. Machinability is affected by a change in lead content. Tin must be held down to avoid the cost, since it is the highest priced constituent. Tin also must be (*Please turn to page* 86)

QUESTIONS and ANSWERS

Request Suitable Compositions For Cast Steel Lead Pot

We have some cast steel pots to make for melting lead, and will appreciate receiving information on suitable compositions for that class of work.

For a great many years plain carbon steel was used for making lead pots, and they gave good service. However, where the user permitted the oil burners to impinge directly on the pots, holes were burned right through them by oxidation. Hence, it is necessary to see that the burners are located so that they do not play directly on the pots. Cast alloy steel pots will give better service life, and it is suggested that you try any of the following compositions which are included in A.S.T.M. specification A157-36 on alloy steel castings for valves, flanges and fittings for service at temperatures from 750 to 1100 degrees Fahr.:

One is designated C4 and contains 0.75 to 1.50 per cent nickel, 0.50 to 1.00 per cent chromium, and 0.30 to 0.60 per cent molybdenum. The other is C5 and contains 4 to 6 per cent chromium and 0.40 to 0.65 per cent molybdenum. Manganese, phosphorus and sulphur maximum limits on both steels are respectively 1.00 per cent, 0.05 per cent and 0.06 per cent. Carbon on C4 is 0.45 per cent maximum while on C5 it may be between 0.15 and 0.35 per cent.

Solid Cylindrical Casting Is Poured Without Riser

We have a solid cylindrical gray iron casting to make 12 inches diameter and 14 inches in length. What is a suitable iron mixture, size and height of sink head and is it necessary to pump the riser to secure a solid casting.

The method pursued in a prominent Mid-west foundry for the production of this type of casting was described in the January, 1938 issue of THE FOUNDRY. The casting is molded on end in green sand in the usual manner, but without a cope. The mold is covered with a dry sand core containing a semicircular depression or basin. A small opening ¾ to 1-inch diameter forms a connection between the bottom of the basin and the top of the casting. At this point the sand is between ¼ and ½-inch thick. Metal is poured into the mold through a gate cut in the joint of the mold at the top. Pouring is stopped when the rising metal touches the dry sand core. The basin then is filled with fresh, hot iron which naturally is at a higher temperature than the upper metal in the mold. The surface of the metal in the basin is covered with a handful or two of a good insulating material in powdered form and no further attention is paid to it. When the casting is taken out it is perfectly solid without piping or shrinkage. The narrow connection between casting and feeding basin easily is broken and there is no expensive chipping or grinding.

Sand in Drag Causes Trouble On Cope Side of Casting

We are forwarding for your examination a piece of cast iron taken from a disk 27 inches diameter 2 inches thick, and with a hub 3 inches deep on one side. The casting is poured with the hub side in the drag. This face is not machined. In attempting to machine the cope face we uncover blowholes all over the surface. We shall appreciate your opinion on the cause or the cure for these blowholes.

Direct cause of the blowholes on the upper face of the disk casting is the condition of the sand in the drag. This condition causes the metal to bubble in the mold—boil is the term usually applied in the foundry—with the result shown. If the casting had been thin the bubbles would appear all through the casting. In this comparatively thick casting the metal remained fluid long enough for most of the gas or steam to escape before the bubbling action ceased. A thin skin formed when the metal came into contact with the sand in the cope imprisoned the final crop of bubbles and held them in place only to be revealed when the face was machined.

The most probable cause of the trouble is sand that was rammed too hard, or sand that was a little too damp. Possibly a combination of both. In this green sand mold the sand must be rammed fairly hard to prevent the face from yielding under the weight with a consequent increase of weight in the casting. Therefore, it is advisable to vent the drag face with a wire and see to it that the vent has a chance to escape between the lower edges of the drag and the bottom board. Incidentally prudence would seem to suggest that since only the flat face is machined, that this face should be cast in the drag.

Thin Clippings May Lead to Trouble

We employ 25 per cent steel scrap in our cupola charge, and would like to know whether we could employ 16 gage sheet metal clippings for part of the steel content. The sheet metal clippings range from about 4 inches square to 24 inches square. The smaller pieces could be discarded if necessary. Could the clippings be used in conjunction with heavier steel scrap? Cupola blast pressure is 10 ounces.

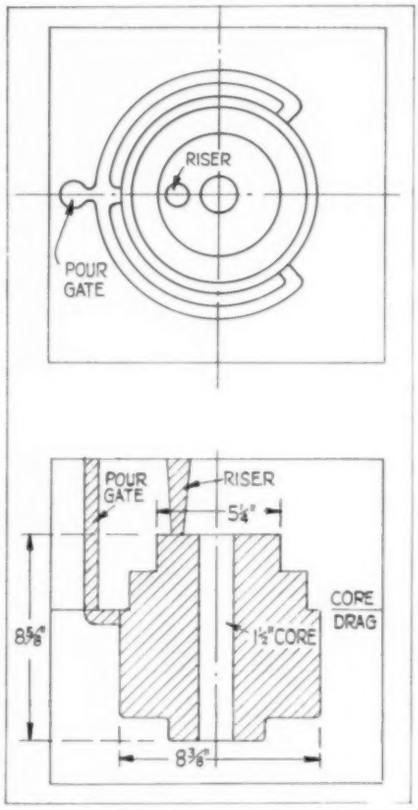
Due to the fact that sheet steel clippings present a large area of comparatively little weight, addition of that material in the loose form to the cupola charge undoubtedly will lead to considerable trouble from oxidized iron at the spout. The thin pieces of metal will tend to become red hot and oxidize considerably before melting. While the major portion of the oxidized iron probably will be picked up by the slag, some of it may become entrained in the molten iron and carried over the spout. Your sheet clippings may be employed satisfactorily if they are compressed into bundles or cabbages under heavy pressure which provides a product possessing a much better weight to area relationship.

Place Larger Riser On the Casting

We find shrinkage in the bore of a gray iron hub casting 8⅝-inches high, 8⅜-inches diameter at the center and 5¼-inches diameter top and bottom. Part of the casting is molded in the drag and the remainder in the cope. Metal enters the casting through three equally spaced gates at the joint of the mold, fed from a single sprue. The casting has an 1½-inch diameter core in the center and is fed with a rod through a riser on top. The iron mixture is made up of 40 per cent pig iron and 60 per cent miscellaneous scrap. Analysis of the pig iron is: Silicon 2.53 per cent, sulphur 0.024 per cent, phosphorus 0.55 per cent, manganese 0.79 per cent. We shall appreciate your opinion on how to secure a solid, clean casting.

Since the casting shows shrinkage in the bore, presumably some distance from the top, it is apparent the avenue of communication between feeding riser and center of the casting became closed before the center of the casting solidified. Your problem therefore resolves itself into keeping that avenue open. This can be done by adopting the technique of the steel foundry.

Extend the hub for a distance of 6 inches in the cope and about ½-inch above the casting increase the diameter to 7 inches. After the metal appears in the bottom of the riser, cease pouring metal through the gate and fill the riser with hot metal from the top. Cover it with



Bulky casting cannot be fed properly through a small riser

a shovelfull of blacking. Iron foundrymen, with the exception of roll makers hesitate to adopt this method on account of the large amount of waste metal involved and the work required to remove the riser. However, it is the only way to secure an absolutely solid casting. In an adaptation of this idea a flat core ½-inch thick is placed on top of the hub with an opening approximately 1-inch wide all around the center core.

Metal from the large riser on top, as in the first instance, will feed the casting through this opening. The riser readily may be knocked off with a sledge hammer. If a universally solid structure is not absolutely essential, that is if a small shrinkage cavity in the body of the casting remote from the bore does not constitute a factor of any importance, you have another option. Gate and head the casting as at present, but substitute a piece of extra heavy steel pipe for your present sand core. The pipe should be cleaned thoroughly by sandblasting or pickling and then filled with thoroughly dried sharp sand. This can be done after the pipe is in place in the mold. The pipe will chill the metal in the immediate vicinity and any shrinkage area that may develop will not be disclosed during the boring operation. Outside diameter of the pipe will be slightly less than the finished diameter of the bore.

Color the Face of Bronze Tablet

We shall appreciate your advice on the best method of securing a smooth surface on bronze memorial tablets, the best metal for these castings and the acid mixture for imparting a finish to the surface. We have in mind particulary a bright green finish, also a bright bronzy color different from the as-cast color of the casting.

A fine grade of sand on the face of the pattern will produce a smooth face on the casting. Small tablets readily may be cast in green sand, but for the larger sizes it is advisable to spray the face of the mold with a thin solution of blacking in molasses water. The face of the mold then is skin dried either in the oven, under a charcoal fire, or with a torch. The usual alloy metal for tablets contains: Copper 90 per cent, zinc 7.5 per cent, tin 2.5 per cent. A second alloy, slightly more expensive but not so apt to produce smoky castings is made up of: Copper 88 per cent, tin 6 per cent, zinc 3.5 per cent, lead 2.5 per cent. A lighter colored alloy contains: Copper 79 per cent, zinc 20 per cent, tin 1.00 per cent.

This really is a yellow brass and will be found more suitable for light, thin castings. The verde antique or green color is secured by either washing the castings or dipping them into a solution containing: Copper nitrate 4 ounces, ammonium chloride 4 ounces, copper chloride 4 ounces, water 1 gallon. Various shades ranging from brown to blue black may be developed through the use of a solution containing potassium sulphide (liver of sulphur) 3 ounces, sodium hydroxide (caustic soda) 3 ounces per gallon of water. This solution is used at a temperature of 80 degrees Cent. (170 degrees Fahr.) the casting either is washed or immersed for a sufficient period to obtain the desired color. High lights afterward are secured by scouring with pumice stone.

A second solution for the same purpose and used at a temperature of 122 degrees Fahr. contains: Barium sulphide 2 ounces to the gallon of water. Feature length articles on the production of tablets appeared in the September and October, 1934 issues of THE FOUNDRY, the first two of a series of five articles dealing with the use of plaster patterns.

Cover Leaks Around The Inlet Hub

We are sending to you a bronze pump cover which is causing us a good deal of trouble due to leaks around the inlet hub. We would appreciate any advice on a remedy. The castings are made of 85-5-5-5 ingot metal including a few old runners. The metal is melted in crucibles by high pressure gas and a small quantity of phosphor-copper is added to the metal a few minutes before pouring. The castings are poured with the hub in the drag with a straight runner cut to the edge of the cover. The cope is 3 inches deep and we use a small runner cup. We skim the metal before pouring.

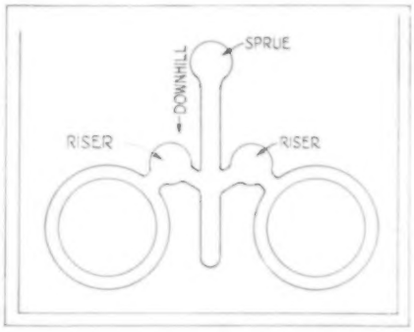
Examination of the casting submitted for inspection indicate that the center or inlet hub has not been fed sufficiently to provide solid metal. While we are not familiar with certain details of your molding practice, we cannot see why dense metal cannot be obtained in the hub. In the first place, your cope is extremely shallow, and should be increased to about 6 inches. A small riser should be attached to the central portion to insure proper feeding at that point. If the hub is cast solid, it will be to your advantage to put a small core, say about 1¼ inches in diameter at that point to obtain a more uniform metal thickness throughout the castings. If you do use a core, you might try using a piece of steel shafting as the core to insure quicker setting of the metal. However, unless the steel shafting is absolutely clean and dry, blowholes are sure to be encountered.

Valve Rings Do Not Stand Pressure

We are trying to make some wedge gate valve rings in the 88-10-2 alloy for 4, 6, 10 and 12-inch valves, and have trouble in that they will not withstand hydrostatic pressure test. The 4-inch rings are made four in a flask and gated from a central runner. The 6 and 10-inch rings are cast singly with a gate into the flange. When the gate is cut off a small hole appears at the junction. The 12-inch rings are gated in the center, feeding into a branch extending across the diameter. How should the castings be gated for best results, and will addition of phosphor-copper be of any value?

The 88-10-2 alloy is rather difficult to make absolutely tight against pressure where made under mass production conditions. Theoretically, that alloy must be so cast that the last metal in the casting to cool is that immediately close to the riser. The riser must be adequate to feed it otherwise there would be pin holes or even shrink holes at the junction of the riser and the casting. Unless there is adequate riser feed for each individual casting, you invariably will have difficulty with the majority of the castings. One very simple method to correct this difficulty would be to have a small percentage of lead present in the alloy which would tend to fill up the microscopic interstices and then shut off the passage through which the leakage occurs.

You do not state whether you



A suggested method of gating the rings to eliminate leakage troubles

are forced to use this particular alloy or not, but there are very few cases where this alloy now is used to meet hydrostatic pressure tests. To add phosphor copper to the alloy would tend to make it more fluid where it was somewhat sluggish and possibly might thereby reduce the number of defects but it would not cure the trouble entirely. To reduce the leakage to the minimum, you must gate these castings so that the hottest metal is at the junction where the riser and casting unite. The casting should be poured in a sloping position so that the first metal, which of course cools first, runs to the lower part of the mold, and the last metal to enter the mold, which is the hottest, is at the top of the mold and finally fills the risers and the risers then being hottest, cool last. Consequently, they are fluid even after the casting is set, thus insuring the feeding of the last part of the casting to set. One suggested method of gating is shown in the accompanying sketch.

If, however, you are at liberty to use another alloy, there are a number which would give less trouble. Practically all of them contain appreciable quantities of lead and the tin is less than 10 per cent. One of the alloys that commonly is used for radiator valves and other such service where leakage is one of the factors which must be considered is an alloy made up of copper, 90 per cent; tin, 6½ per cent; lead, 1½ per cent, and zinc, 2 per cent. Of course, this alloy has its variations, sometimes the zinc running up to 3 or 3½ per cent and with the lead and tin about the same as previously mentioned, the copper dropping correspondingly below 90. It is approximately this alloy that is used largely in the production of many types of valves. This alloy is specified for low pressure valve work by Federal Specification board as QQ-B-691, Grade 1. The American Society for Testing Materials specification for this alloy is B-61-28.

Cast Iron Sprocket Wheel Is Warped

We are having warpage trouble with a cast iron sprocket wheel 72 inches outside diameter, 57 inches inside diameter, minimum metal thickness 1¾ inches. We pour this casting from two sprues on diametrically opposite sides of the mold. Each sprue is connected to three small gates. The pattern and floor board are new and level.

Although you state that the sprocket wheel warps, you do not say whether it warps out of a horizontal plane, or out of a true circle. Without a knowledge of all the factors in the cycle of production one only can hazard a guess on the cause of the warpage. Since you mention a new level pattern and floor board we assume that your concern arises from the fact that the casting is not flat and true. This may be due to one or a combination of conditions, but the most probable cause may be traced to the shakeout. The casting may be shifted in its bed when the cope is lifted.

Sand from the cope may be shaken out in a manner to leave part of the casting exposed or thinly covered. Even under the most favorable conditions, castings of large area sometimes behave temperamentally and it becomes necessary to deliberately bare certain parts and leave others covered. In some instances the only cure is to leave the casting in the clamped flask over night. A somewhat remote contingency is that the flask does not rest in a well supported and level position on the floor. Even though the pattern and board are true and level, a sagged mold will produce a warped casting.

In the second supposition, a wheel that is not truly round, the cause may be the gates. If the sprues on opposite sides of the flask are jammed against the bars, the casting cannot contract normally, but will be pulled out of round. Sprue and gates should be broken off immediately after the casting has set and before contraction commences.

Fred A. Melmoth

Armand Di Giulio

Calvin P. Wolfe

John T. Clausen

MEN of INDUSTRY

CALVIN P. WOLFE recently was made superintendent, Docks Foundry Co., Three Rivers, Mich. He began his apprenticeship in a small foundry in Union Springs, N. Y., in 1899 and later worked 8 years as a journeyman molder for the Mackintosh-Seymour Co., Auburn, N. Y. In 1910 he was made foundry foreman of the Enterprise Foundry Co., Auburn, and in 1912 accepted a position of foundry superintendent, Johnson Harvester Co., now the Massey-Harris Co., Batavia, N. Y. In 1916 he was appointed general superintendent of the L. J. Mueller Furnace Co., Milwaukee and held that position for a number of years. In 1936 he became connected with the Miller Foundry Co., Columbus, O., and in 1937 was made foundry superintendent of Ebco Mfg. Co., Columbus, O. Recently the latter company decided to close their foundry and enameling department and purchase their material from other sources. The Docks Foundry Co. was established in 1930 by R. G. Dock and his son, W. C. Dock. The company recently purchased the old Fairbanks Morse foundry and is now equipping the plant with cupola, crane, tumbling barrels, etc., providing a considerably larger capacity.

• • •

A. DIGIULIO, formerly research metallurgist for the Ford Motor Co., has been appointed assistant professor of metallurgy, University of Detroit. Mr. DiGiulio was born in Alfedena, Italy, where he attended public schools. After graduating from the Royal Technical institute in Terni, Italy in 1924, Mr. DiGiulio attended the University of Michigan from which school he received his bachelor of science degree in chemical engineering in 1930. In 1932 he received his master of science degree in engineering and 3 years later graduated as doctor of science in metallurgical engineering. While attending the university, he was an assistant in the chemical engineering department for 3 years and was an assistant in the engineering research department for the 5 years prior to his joining the metallurgical research staff of the Ford Motor Co. in 1935.

• • •

FRED A. MELMOTH, vice president, Detroit Steel Casting Co., Detroit, will present the annual exchange paper of the American Foundrymen's association before the annual meeting of the Institute of British Foundrymen to be held in London June 12 to 17, 1939. Mr. Melmoth was born in Sheffield, Eng., and received his technical education at Sheffield university. In 1913 he was appointed an associate in metallurgy and was awarded the Mappin medal. He received his early training at Brown Bailey Steel Works, Sheffield, where he served as an assistant in the research laboratories and as head of the night shift in the open-hearth department. Since that time he has been connected with the National Steam Car Co., Chelmsford. as foundry manager; Lake & Elliott Co., Braintree, Essex, as steel maker and foundry manager; and 4 years prior to coming to the United States to assume duties as technical director of Detroit Steel Casting Co., he was engaged as foundry manager for Thomas Firth & Sons, Sheffield, England.

• • •

JOHN T. CLAUSEN, foundry engineer, Greenlee Bros. & Co., Rockford, Ill., who recently was elected chairman of the Northern Illinois and Southern Wisconsin Chapter of the A. F. A. attended grade school in Los Angeles, Calif., and was graduated from Los Angeles High School in 1915. The following year he attended the Los Angeles Polytechnic high school taking a post graduate course. He then went to work for the Stover Mfg. & Engine Co., Freeport, Ill., working successively in the firm's testing, engineering, and foundry departments. After 3 years in industry, Mr. Clausen entered the University of Illinois, Urbana, Ill., and was graduated with the class of 1924 with a degree of bachelor of science in mechanical engineering. In the fall of 1924 he again went to work in the engineering department of the Stover company later taking charge of its metallurgical work and the automotive foundry division. For the past two and one half years he has been employed as foundry engineer by Greenlee Bros. & Co., Rockford, Ill., where he has been handling engineering problems in both the machine tool foundry and light production foundry.

• • •

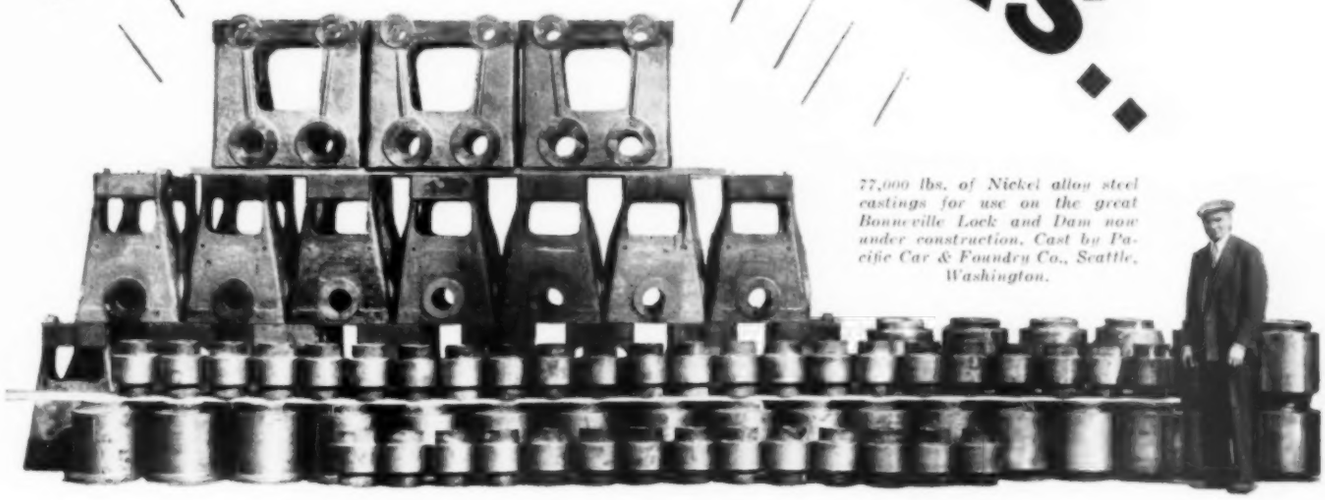
WILDER A. CHAPMAN recently was appointed manager of laboratories, Robert W. Hunt Co., Chicago. Mr. Chapman is a graduate of Tufts college and has been connected with the Solvay Process Co., the Delaware, Lackawanna & Western Railroad, and Skinner & Sherman Inc.

• • •

W. P. MARTIN JR. recently was elected president of the Fisher Furnace Co., Chicago, succeeding Jack L. Stroman, who no longer is actively connected with the manage-

(*Concluded on page* 40)

PILE UP ORDERS..



77,000 lbs. of Nickel alloy steel castings for use on the great Bonneville Lock and Dam now under construction. Cast by Pacific Car & Foundry Co., Seattle, Washington.

...*for* NICKEL STEEL CASTINGS

Vapor Channel casting for refinery. Manufactured from Nickel-chromium steel by Beaumont Iron Works Co., Beaumont, Texas.

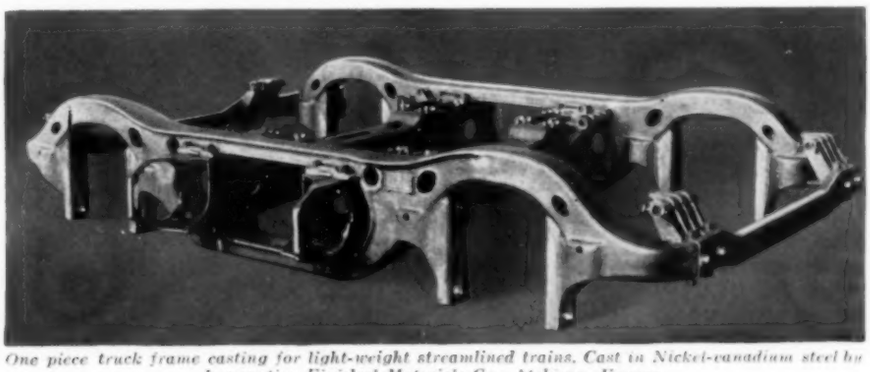
The exacting requirements of modern industry are creating a demand for these alloys

● The superior mechanical properties of Nickel alloy steels are aiding materially in meeting the demands for high quality castings used in light weight as well as in general designs.

Railroads today, are specifying materials of construction which are capable of providing the high strength, improved toughness and ductility required in light-weight designs intended to cut down dead weight of rolling stock. Petroleum producers and refiners seek equipment that will withstand high and low temperatures accompanied by constantly increasing working pressures. Big public work projects call for durable and dependable materials throughout.

All of these exacting requirements are being met with castings of Nickel alloy steel. The excellent service records compiled from many installations offer eloquent testimony of their dependability. The ever increasing demands for Nickel steel castings is evidence of their acceptance by industry.

The cast Nickel steels possess greater strength, resistance to wear, shock and fatigue and stand up under varying temperature and pressure conditions. An important feature is their high strength-weight ratio making them ideally suited for castings employed in light-weight designs. Consultation on the use of Nickel in steel castings is invited.



One piece truck frame casting for light-weight streamlined trains. Cast in Nickel-vanadium steel by Locomotive Finished Materials Co., Atchison, Kansas.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

(*Concluded from page 38*)

ment of the company. Kenneth D. Hoke was elected secretary and appointed factory manager, P. J. Myall will continue as sales manager and Robert Beebe was elected assistant secretary.

♦ ♦ ♦

W. O. BATES JR., San Francisco, has been made manager of the pattern department of the Caterpillar Tractor Co., Peoria, Ill.

♦ ♦ ♦

W. F. BENDER has been appointed sales representative in Pennsylvania and West Virginia by the Ohio Steel Foundry Co., Springfield, O. His headquarters will be in Pittsburgh.

♦ ♦ ♦

WILLIAM C. SCHULTE, former metallurgist, A. O. Smith Corp., Milwaukee, has been appointed assistant professor of mechanical engineering, Rutgers university, New Brunswick, N. J.

♦ ♦ ♦

GEORGE R. GREGG has been named representative in the Pittsburgh area by Michiana Products Corp., Michigan City, Ind. Mr. Gregg has established offices in the Clark building, Pittsburgh.

♦ ♦ ♦

ALEXANDER G. CHRISTIE, professor of mechanical engineering, Johns Hopkins university, Baltimore, has been elected president of the American Society of Mechanical Engineers, New York, for 1939.

♦ ♦ ♦

CARL L. LEAFE has been appointed superintendent of the Norton Co. of Canada Ltd., Hamilton, Ont. Mr. Leafe succeeds ALBERT JOHNSON, recently named consulting engineer for the Canadian plant.

♦ ♦ ♦

HARVEY NICHOLSON, St. Louis, a graduate of Missouri School of Mines and Metallurgy, Rolla, Mo., has joined the laboratory staff of Stearns Magnetic Mfg. Co., Milwaukee.

♦ ♦ ♦

CHARLES KNUPFER and HENRY P. KIRCHNER, have been appointed vice presidents of the Carborundum Co., Niagara Falls, N. Y. ARTHUR BATTS, secretary and Mr. Knupfer have been appointed members of the board of directors of the company.

♦ ♦ ♦

EDWARD G. BURGESS, superintendent, Toronto, Ont., plant of Massey-Harris Co., manufacturer of tractors and implements, has been appointed general superintendent in charge of the company's Racine, Wis., and Batavia, N. Y. plants.

♦ ♦ ♦

PETER J. WATRY has been made president and general manager of the Meta-Mold Aluminum Co., Milwaukee. Mr. Watry has been in charge of production and assistant in the management of the business almost since its inception and succeeds John T. Watry who has retired from active business. N. J. WATRY is vice president and treasurer and W. H. MARKERT is secretary.

♦ ♦ ♦

EDWIN THOMAS, assistant works manager for the past 10 years of the Standard Steel Works Co., Burnham, Pa., subsidiary of the Baldwin Locomotive Works, has been appointed works manager. He has been associated with the company since 1909.

♦ ♦ ♦

WILLIAM P. WOODSIDE, vice president, Climax Molybdenum Co., Detroit, has been elected president of the American Society for Metals.

W. P. Woodside

Just 25 years ago Mr. Woodside and a small group of men, interested in the new art of heat treating, gathered in Detroit and organized the Steel Treaters' club. This organization grew and became the Steel Treating Research society, one of the founder societies in the present American Society for Metals.

♦ ♦ ♦

J. N. WALKER has been elected vice president of Oxweld Acetylene Co. Taking his place as general sales manager of the Linde Air Products Co., is his former assistant, T. D. CARTLEDGE. Both these companies are units of the Union Carbide & Carbon Corp., New York.

♦ ♦ ♦

JOHN R. JOHNSTON, formerly manager of sales of the Milwaukee district sales office of Carnegie-Illinois Steel Corp., recently has been appointed assistant manager of sales, Chicago district sales office which is one of the corporation's largest district sales offices.

♦ ♦ ♦

J. R. TOWNSEND, materials standards engineer, Bell Telephone Laboratories, Inc., New York, has been elected a member of the executive committee of the American Society for Testing Materials. Mr. Townsend fills the vacancy by the recent resignation of Allen Rogers.

Steel Foundries in South Form Group

Under auspices of the Steel Founders' Society of America, a majority of the steel foundries located in the South recently established an operating executive group with A. B. Wilkerson, Beaumont Iron Works, Beaumont, Texas, as chairman. With the formation of this group the organization of executives in charge of production throughout the steel casting industry virtually is complete.

Program of activities of the newly formed group will embrace discussions of molding sands and sand control methods, modern melting practices, ladle supplies and maintenance, employe relationship, cost studies, and various other technical problems. Main purposes are to promote highest standards of quality in the product and to increase production efficiency.

A feature of the next meeting, scheduled for December, will be a lecture by C. W. Briggs, technical adviser, Steel Founders' society, on "Directional Solidification and Its Relation to Correct Steel Casting Design."

Co-operation with engineering schools and colleges is likewise being planned. It is estimated that 95 per cent of the steel foundry industry now is served by similar operating executives groups.

Publish Directory

The sixth edition of its directory of materials recently has been published by *Machine Design*, Penton building, Cleveland. The book contains 68 pages, 9 x 11 inches, and is divided into 8 sections. The first section lists iron, steel, and nonferrous metals by trade names, while the second tabulates plastics and other nonmetallics by trade names. The remaining six sections are devoted to lists of firms producing iron, steel, and nonferrous products, plastics and nonmetallic materials, stampings, forgings, die castings, and custom molding firms. Copy of the directory may be obtained through THE FOUNDRY for 25 cents each.

Consulting Service

Charles H. Hughes has established a consulting engineering service at 270 Broadway, New York. He was for many years research engineer and designer of equipment for Semet-Solvay Engineering Corp. Mr. Hughes is widely known for his work in coal carbonization, carbureted water gas and related products and processes in the by-product coke oven and gas industries.

To The Foundryman Who Now Can't Use Black Sand

Our Suggestion Is . . .

TRY BLACK SAND AND TRULINE BINDER*

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Chicago Chapter Stages First Regional at Purdue

IN EXCESS of 225 foundrymen attended the first regional foundry conference held at West Lafayette, Ind., Oct. 27 to 29 under the joint auspices of the Chicago chapter of the A.F.A. and Purdue university. Simultaneous sessions on Thursday and Friday presented interesting discussions on problems pertaining to gray iron, steel and malleable iron practice.

The conference was opened Thursday morning by Harold W. Johnson, Greenlee Foundry Co., Chicago, and chairman of the committee in charge of arrangements. A. A. Potter, dean of engineering, Purdue university, welcomed the visitors to the campus. Dean Potter paid tribute to the foundry industry for progress made in recent years, and stressed the importance of research to any industry as insurance for tomorrow. The dean also described the facilities of Purdue university, which, he said, is the largest engineering school in the world. L. H. Rudesill, Griffin Wheel Co., Chicago, and chairman of the Chicago chapter, extended a welcome on behalf of the chapter while Robert E. Kennedy, secretary, A.F.A., Chicago, extended greetings on behalf of the association.

The first session on gray iron dealt with cupola raw materials and included the following papers: "Some Concepts of Raw Materials" by R. H. Bancroft, Perfect Circle Co., Hagerstown, Ind.; "Foundry Coke and the Cupola," by B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis; and "Materials Handling," by E. L. Reed, Whiting Corp., Harvey, Ill. H. K. Briggs, Western Foundry Co., Chicago, was chairman of the session.

Considers Raw Materials

Mr. Bancroft examined the following raw materials: Men, iron, fuel, refractories and alloys, from the standpoint of the following angles: Importance of material in the industry, endurance of supply, price, quality and development of quality, sales and market practices, and future outlook of the material. The speaker pointed out that the prices of most the raw materials considered are so fixed as to be unalterable by any individual foundryman. Today men constitute the prime raw material and the supply must be carefully selected, utilized and conserved. The fact that most raw materials are abundant need not prevent conservation.

Mr. Bancroft believes that while the tonnage of iron produced may have passed its peak, quality production is just beginning. He also pointed out that pig iron vendors should attempt exposing foundry superstitions instead of promoting them. The speaker's experience indicates that foundrymen will do well to stop blaming the quality of pig iron for their own failure to melt properly. In the general selection of raw materials, according to Mr. Bancroft, and especially in the manufacture of gray iron, it should be remembered that the product owes its existence to its low cost.

The discussion by Mr. Mulcahy dealt first with some fundamental

(*Continued on page* 44)

OSBORN INDEX MOULD CONVEYOR & SAND CONDITIONING & HANDLING SYSTEMS

for Snap and Slip Flask Moulding

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● The Osborn Index Mould Conveyor System with all operations under synchronized control, offers all the desirable features of a continuous running conveyor with added advantages peculiar to this type conveyor only. Weights and jackets are suspended over moulds at correct positions on lifting mechanisms and are easily and positively lowered and raised by means of hand levers with minimum effort. This feature together with the other important advantages minimizes physical fatigue and contributes to more good castings per man.

The Osborn Index Conveyor System enables the definite allocation of individual responsibility and eliminates otherwise uncontrollable factors in the operation of a conveyor system. INVESTIGATE!

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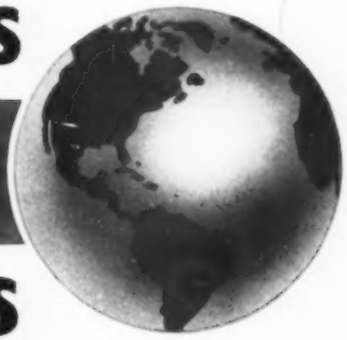
IMPORTANT ADVANTAGES

1. Space always immediately available for mould set out on conveyor.
2. Each conveyor plate always indexed to same pouring position.
3. Moulds are stationary when poured.
4. Pouring stations know in advance the nature of the work and responsibility is definitely placed.
5. Correct jackets and weights always in place over proper mould at pouring station.
6. Automatic shakeout eliminates manual assistance at this position.
7. Correct bottom boards always automatically returned to moulding station.
8. Minimum number of bottom boards and orderly control at moulding stations facilitates changing of jobs with least possible confusion.
9. The synchronization of all operations under visual conditions provides quick and accurate supervision.
10. Compact and efficient arrangement of all units.

TIME PROVES VALUES



OSBORN

MOULDING MACHINES

(*Continued from page 42*)

principles governing cupola operation, with particular reference to the rapidity of changes and the inequalities existing in any cupola. These conditions are imposed by the process itself but further variations can and do occur if modifications are made in practice and equipment. The second portion of the discussion pointed out the influence of cupola design on combustion reactions and the state of materials existing in various parts of any cupola. Each phase of state and contact exerts an individual influence on the iron composition. Superimposing the individual combustion and chemical characteristics of different cokes will modify the reactions existing during the various phases of melting. Mr. Mulcahy stated that to improve the product, the coke manufacturer must be interested in the problem of interpreting coke influence on cupola operation and modifying coke characteristics. Neither problem is impossible in accomplishment, but time, patience and effort are required.

The final paper by Mr. Reed stressed the importance of mechanical equipment in charging the cupola. Mr. Reed pointed out that a survey for material handling and mechanical charging should take into account a wide variety of factors including location and arrangement of material in relation to cupolas, advisability of a new location for either cupolas or material yard, size of cupola building, size and number of cupolas operating at a time, different mixtures of iron required, size of castings made, probable cycle of charging operation, number of man hours required to make and charge cupolas, etc.

Use Mechanical Equipment

From such information, Mr. Reed stated it is possible to determine the equipment best suited for the particular job at hand. The experienced engineer will figure that charging really begins when cars containing raw materials arrive in the yard, and therefore, will plan every move from the railroad car to the cupola. All unnecessary handling will be eliminated and every move will be accomplished by mechanical means, the size of the particular job permitting.

The afternoon session on gray iron featured a talk, "Cupola Melting Operations," by John L. Lowe, Centrifugal Fusing Co. division, Campbell, Wyant & Cannon Foundry Co., Lansing, Mich. Garnett P. Phillips, International Harvester Co., Chicago, was technical chairman of the session. Mr. Lowe described in some detail a method which has been developed for operating a cupola five successive 8-hour days, the melting furnace being banked between operations. This operation was carried on with the metal at the cupola spout in excess of 2800 degrees Fahr. The metal in the operation employs a mixture containing some 60 to 70 per cent briquetted borings. Mr. Lowe pointed out that the eventual object is to operate the cupola steadily for months, banking the cupola over weekends.

Discussion on the paper centered on cost, coke, refractories, and metal composition. The design and construction was described by Mr. Lowe and was commented on freely by those present. The possibility of eventually perfecting some methods of a flow of raw materials into the cupola was discussed.

J. D. Burlie, Western Electric Co., Chicago, was chairman of the third gray iron session, held Friday morning and devoted to casting defects, causes and remedies. It was emphasized in the various discussions on this subject that the problem of defects pertains only to the foundry and that through proper inspection, defective castings are not shipped to the customer.

Why Castings Are Defective

"Casting Defects Due to Sand," by A. W. Weston, Chicago Hardware Foundry Co., North Chicago, Ill., outlined the following eleven causes and presented remedies for each: Cuts, dirty castings, drops, hot casting cracks, scabs, blows, rat tails, gas seams, pin holes, rough surfaces and metal penetration. The speaker stressed the fact that each defective casting requires individual attention to determine the probable causes of the difficulty.

Second paper, "Production of Dense Structures in High Test and Alloy Iron Castings" was presented by M. A. Scott, Greenlee Foundry Co., Chicago. To overcome problems in producing uniform, dense structure castings of high test and alloyed iron, experimental work was conducted by pouring castings through risers as gates. Mr. Scott stated it was found that this method of gating and risering was very successful. The investigation was developed from a desire to determine why shrinkage holes in some cases appeared at the gate and in the adjoining metal. From the experiments, it was observed the temperature of the sands surrounding the gates and risers greatly influence shrinkage. With this in mind, a gating and risering practice was developed which took into consideration the affect of hot sand. The practice has been used successfully on such castings as bushings, die wheels, rolls, etc.

The final paper at the gray iron session, presented by Martin Lefler, Oliver Farm Equipment Co., South Bend, Ind., was entitled "Casting Defects Other Than Sand." These causes according to Mr. Lefler, may be classified broadly as follows: bad molding, defective metal, bad gating and risering, poor design of casting, defective cores and defective pattern equipment. The speaker also pointed out that in seeking the causes for scrap castings, it is extremely important that logic based upon fundamental laws should be applied to the case in question. A large portion of casting defects may be caused by two or more factors working at the same time. In some cases, one factor or cause for scrap will offset another to produce a good casting.

The Friday afternoon session was devoted to an illustrated lecture, "Metallography for the Practical Foundryman," by R. H. Farabee, professor of metallurgical engineering, Purdue university. Illustrations used in this lecture were prepared with the assistance of L. F. Lottier, Peoples Gas, Light & Coke Co., Chicago, and Dr. James T. Mackenzie, American Cast Iron Pipe Co., Birmingham, Ala. Prof. Farabee discussed carbon, silicon, manganese, phosphorus and sulphur, and the effect of these various elements upon the structure of the iron. The speaker also correlated the metallographic constituents and some of the mechanical properties of the cast iron.

Improve Matrix Strength

Prof. Farabee developed the idea that any graphite formed in high strength cast iron should be finely divided, rounded in form and evenly distributed. By the use of various alloying elements, the strength of the iron matrix can be improved and a more favorable effect on the behavior of graphite may be secured.

Saturday morning was devoted to demonstrations. Harry W. Dietert, Harry W. Dietert Co., Detroit, with the assistance of J. A. Schuch of the same company, demonstrated methods for the rapid determination of carbon and sulphur in irons and steels and also the manipulation and use of the spectrograph in the foundry for the rapid routine analysis. A. M. Sampson, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., described the method used by his company for rapid routine analysis by use of the spectrograph. Following this demonstration, the meeting adjourned to the Civil Engineering building where Prof. R. B. Crepps, department of civil engineering, demonstrated the determination of the tensile strength, yield point, transverse and deflection tests on iron and steel specimens. He also

(*Continued on page 46*)

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(*Continued from page* 44)

showed instruments for the determination of hardness and specimens used to determine the impact resistance of metals.

Three sessions were devoted to discussion of various phases in the production of malleable cast iron, including melting practices and materials of melting, annealing practices, and casting defects, their causes and remedies. The first session on melting practices and materials of melting was held on Thursday morning under the direction of L. H. Rudesill, Griffin Wheel Co., Chicago, chairman. First paper of the session was presented by P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill., which discussed the conventional air furnace.

Describes Air Furnace Operation

Mr. DeBruyne described the powdered coal fired units used in his plant. Two 25-ton furnaces are employed, and they melt two heats a day. The morning heat is comprised of 45 per cent sprue, 10 per cent malleable scrap and 45 per cent pig iron which gives a hard iron analysis of 0.95 to 1.05 per cent silicon, 0.27 to 0.30 per cent manganese, 0.15 per cent phosphorus, 0.055 to 0.065 per cent sulphur and 2.40 to 2.50 per cent carbon. The afternoon heat is composed of 45 per cent sprue, 12 per cent malleable scrap, 3 per cent steel scrap, and 40 per cent pig iron which gives a hard iron analysis similar to that previously mentioned.

According to Mr. DeBruyne, coal consumption is approximately 700 pounds per ton of iron. Time to melt the morning heat is about 20 minutes per ton for a 15-ton heat and the afternoon heat of similar size is melted at the rate of 17 minutes per ton. Extraction of iron from the furnace is approximately 2 minutes per ton for ordinary work. Occasionally when the work is heavier, the time drops to 1½ minutes per ton. For heats over 15 tons, the metal is tapped at three spouts. For smaller heats and a smaller number of molders, only two spouts are tapped.

J. O. Klein, Southern Malleable Iron Co., St. Louis, presented the second paper on duplexing malleable cast iron which dealt with the procedure applied in his plant. According to Mr. Klein the advantages of duplexing are a low raw material cost, a low refractories cost, and availability of metal when it is desired. He pointed out that to obtain benefits from duplexing the melt must be over 30 tons a day. Metal charged into the cupola consists of 2 to 3 per cent silvery pig, 13 to 15 per cent malleable pig iron, 12 to 18 per cent malleable iron scrap, 20 to 30 per cent steel scrap and 45 to 50 per cent sprue with a sufficient amount of spiegel to obtain the desired manganese content. The cupola melts at the rate of 15 tons per hour, and the iron enters the air furnace at approximately 2700 degrees Fahr. When the entire heat is out of the cupola, it is held in the air furnace about 1 hour at which time the metal is approximately 2853 degrees Fahr. which is the temperature required for the particular line of work.

Description of the rotary powdered coal fired furnace was presented by James H. Lansing, Malleable Founders' society, Cleveland. He said that the rotary type furnace is quite flexible in that it may be applied successively on widely varying mixtures such as malleable cast iron, gray cast iron, special alloy iron and high test iron. The furnace may be started up at a few minutes notice and operated for any length of time desired. From one to eight heats per day are entirely practicable and, as previously mentioned, each heat may be a different metal.

Air Preheated in Stack

To effect complete combustion and promote economy, air preheated to approximately 500 degrees Fahr. for the secondary, and 225 degrees Fahr. for the primary is supplied through a hollow stack lining. About 15 minutes is consumed in charging a hot furnace, and approximately 1¾ hours are required to melt and bring to pouring temperature an 8-ton heat. Tapping temperature used at the particular foundry is 2850 degrees Fahr. Fuel consumption varies from 400 to 500 pounds per ton of iron melted. Using acid refractories, the refractory cost will vary from 30 to 70 cents per ton of iron, and total power cost will range from 15 to 25 cents per ton of iron melted.

Final paper of the first session on malleable cast iron discussed malleable furnace refractories, and was presented by Carl S. Wirth, Terre Haute Malleable & Mfg. Co., Terre Haute, Ind. He said that the refractory giving the most difficulty at the present time is the bungs which are subjected to the severest operating condition of the furnace from the standpoint of thermal shock. Operating practice will determine the type of brick to be used. If the bungs can be handled with extra care, a soft type brick will be best, but if the bungs must be stacked, then harder brick must be employed. He mentioned that bungs built of 9-inch and 13½-inch brick in alternate rows, that is two 13½-inch and then three 9-inch last 30 to 40 per cent longer than bungs built entirely of 13½-inch brick.

The second malleable cast iron session under the direction of B. C. Yearley, National Malleable & Steel Casting Co., Chicago, was held Thursday afternoon, and was concerned with the subject of annealing practices. L. E. Roby Jr., Peoria Malleable Iron Co., Peoria, Ill., described conventional annealing practices applied in his foundry. Castings are annealed in batch type ovens fired by hand and by powdered coal, with capacities of approximately 25 tons. With the hand fired oven, and a coal cost of $4.08 per ton, the coal cost per ton of castings annealed is $2.24. With pulverized coal firing and a coal cost of $3.58 per ton, the coal cost per ton of castings annealed is slightly over $1.07. A 7-day cycle is employed with the ovens. Approximately 40 hours are required to bring the furnace to 1600 degrees Fahr., and the castings are held for 44 hours at that temperature. Then the castings are cooled to 1400 degrees Fahr. which requires about 18 hours. Slow cooling through the critical range down to 1150 degrees Fahr. requires 42 hours.

C. C. Lawson, Wagner Malleable Iron Co., Decatur, Ill., described the application of controlled atmospheres to annealing of malleable cast iron. The type of furnace discussed is an intermittent or batch type, radiant tube furnace. Controlled atmosphere supplied to the furnace is generated in a special unit, and is supplied to the furnace under a pressure of 1 to 2 ounces to exclude air infiltration. Approximately 9 hours are required to bring the furnace up to 1725 degrees Fahr. at which the castings are held for 23 hours. Then by blowing cold air through the tubes, the castings are cooled to 1400 degrees Fahr. in 2½ hours. Temperature is reduced from 1400 degrees to 1320 degrees Fahr. in 8½ hours and the castings are held at 1320 degrees for 8 hours. After that holding period, the castings are cooled to 1225 degrees in 8 hours and then pulled from the furnace.

Eliminate Pots and Packing

Short cycle annealing was discussed by W. D. McMillan, International Harvester Co., Chicago. He said that in general annealing cycles have been shortened by mechanical and metallurgical methods. Shortening by mechanical means is largely a matter of design of the furnace and by the application of nonscaling, nondecarburizing atmosphere which has made it possible to eliminate pots and packing. Metallurgical means of reducing the annealing cycle involves the use of high silicon content ranging from 1.55 to 1.70 per cent which speeds up graphitization to a considerable degree. Hence a combination of the two methods leads to the shortest pos-

(*Concluded on page* 48)

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MAHON

(*Concluded from page* 46)

sible annealing cycle.

Final technical session on malleable cast iron was held on Friday morning with G. B. Stantial, Illinois Malleable Iron Co., Chicago, acting as chairman. Topic of the session was casting defects and their remedies, and the first paper was presented by L. F. Hartwig, Chicago Malleable Castings Co., Chicago. Mr. Hartwig said that the most easily remedied defects are those detected by surface inspection, and include chill blows, strains, run-outs, crush, shifts, etc. Another group which cannot be so readily remedied includes shrinks, hot tears, hard iron cracks, misruns, and cold shuts. However, by careful study of the underlying causes of such defects they may be eliminated.

Harry W. Dietert, H. W. Dietert Co., Detroit, discussed the relation of sand to castings and pointed out that by developing standardized practices for molding and core sands, little trouble would be encountered from defects attributable to those materials. Numerous routine tests should be run and records maintained so that any changes in conditions can be determined and the necessary corrections applied at once.

Talk on Melting Methods

Many phases in the production of steel castings were discussed at two sessions on Thursday and one session on Friday. Manufacture and application of steel castings were described by H. A. Forsberg, Continental Roll & Steel Foundry Co., East Chicago, Ind.; operation of the converter was described by F. B. Skeates, Link-Belt Co., Chicago; the electric furnace was the subject of a paper by Al. Gierach, American Manganese Steel Co., Chicago Heights; John W. Porter, American Steel Foundries, covered the subject of the open-hearth furnace; casting design was discussed by C. W. Briggs, Steel Founder's society, Cleveland; and F. A. Melmoth, Detroit Steel Castings Co., Detroit, presented a paper on steel casting properties.

At the steel session Thursday morning C. E. Westover, Burnside Steel Foundry Co., Chicago, presided as technical chairman while H. A. Forsberg, Continental Roll & Steel Foundry Co., Chicago, presented a paper, "Manufacture and Application of Steel Castings." In an extensive reference to the railroad field he stated that at present about 35 per cent of the weight of the modern locomotive is steel castings and between 16 and 18 per cent of the modern freight car is made up of the same reliable material. Principles of correct design have been fairly well standardized. Sharp internal corners should be avoided, abrupt changes in sectional thickness should be eliminated, heavy bosses and chunky sections in isolated spots should not be incorporated in the design. The formal presentation was followed by exhibition of pictures showing a wide variety of steel castings ranging in weight from ounces up to 250 tons.

Intimate and detailed description of the three principal steel making processes were presented at the Thursday afternoon session under the chairmanship of Bert Aamodt, National Malleable and Steel Castings Co., Chicago. Following a brief historical introduction F. B. Skeates, Link-Belt Co., Chicago, described an installation of two Zenze type side blown converters with two cupolas and other auxiliary equipment. The cupola charge is made up of 300 pounds low phosphorus pig iron, 1000 pounds return scrap, 900 pounds steel scrap and 100 pounds 50 per cent ferrosilicon. The metal from the cupolas is desulphurized with 50 pounds flake caustic soda and 10 pounds lime.

Operate the Converter

Essential features of converter operation include: Hot iron with silicon content between 1.75 and 2.10 per cent; manganese in cupola metal about 0.50 per cent; converter lining held to size; accurate weighing of materials. According to the speaker, if these essentials are observed, the operator should have no difficulty in meeting any reasonable chemical or physical specification.

Following an introductory reference to the development of alloy steels and the part played by the electric furnace, A. G. Gierach presented a description of the methods employed in the preparation and operation of acid and basic lined furnaces. He stressed the importance of a good bottom upon which the working surface is either rammed or burned in. A good rammed bottom is better than one that is not burned in properly. On the choice of basic or acid process he stated that the acid process is favored by many because of the greater fluidity obtained and the higher voltages that may be used with consequent faster production. For closer chemical control, greater efficiency in recovering and preserving the alloys, and in cases where raw materials dictate, the basic furnace presents advantages.

Other features included composition and method of applying bottom materials, bringing the furnace up to temperature, contamination of the heat, wash heats, methods of charging, melting down and refining periods, steel scrap specifications, moisture, flexible range of voltages and power inputs, working the heat, slags, difference between metal for castings and for ingots, deoxidation.

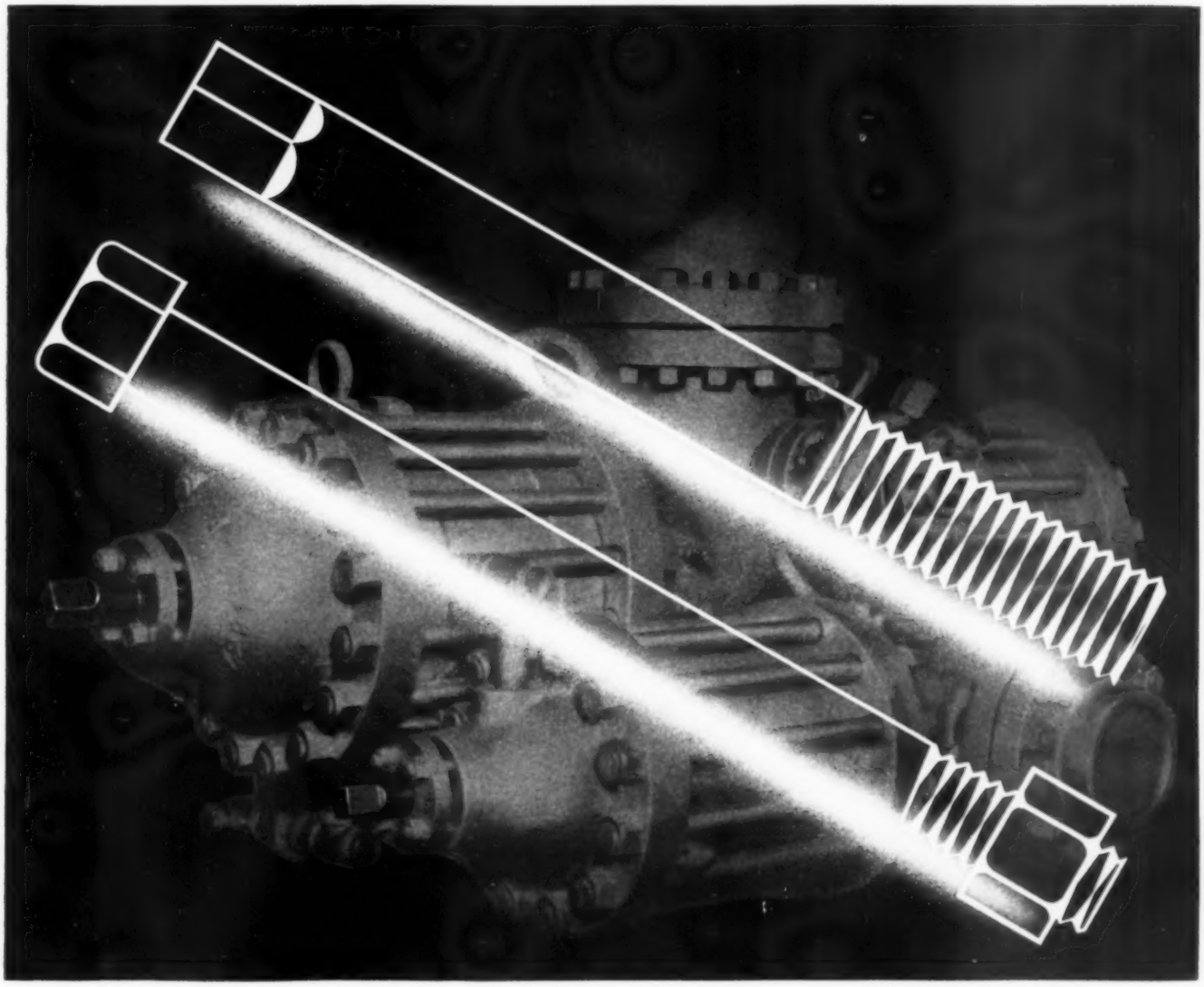
The paper by J. W. Porter, American Steel Foundries, Chicago, was devoted principally to the construction and method of operating the open-hearth furnaces at the Granite City plant and covered: Building the furnace bottom, tap hole, runners, charging, draft, oil fuel, steam, slag, refining, preliminary tests, furnace additions, finishing and tapping the heat, ladle additions and repairing furnace bottom.

At the Friday morning session under the chairmanship of A. W. Gregg, Whiting Corp., Harvey, Ill., a paper on casting design was presented by C. W. Briggs, Steel Founder's society of America, Cleveland. Experimental results on padding, external and internal chills, and controlled directional solidification were described and illustrated. Models of the original design are helpful. After the foundryman has obtained a workable design he can use the tools at his command, tapered sections, proper gates and heads, chills, relieving blocks, etc., to prevent shrinkage cavities and hot tears. These foundry arts, the speaker claimed, have been used to advantage on poorly designed castings, but they cannot be expected to cure all the evils found in designs.

Discussing steel casting properties at the same session F. A. Melmoth, Detroit Steel Castings Co., Detroit, claimed that the industry as a whole has not publicized its technical advancement to the extent achieved by the producers of worked steels. The fact that the latter are subjected to mechanical work of a structure modifying type always has been advanced as one reason for superiority.

In the absence of such work, steel castings respond remarkably to various forms of heat treatment and manifest physical properties over a wide range and of a standard equal in many cases to those commonly specified for worked steels. He explained that his talk was designed to illustrate by a series of steels of different analyses, subject to a schedule of commercially used heat treatments, the ready response of cast steels to thermal treatment. A series of physical tests both static and dynamic were shown to illustrate these effects.

An interesting discussion of sword fishing by Dr. J. L. Bray, head of the school of chemical and metallurgical engineering, Purdue university, featured the dinner held Thursday evening in the ballroom of the Purdue Memorial Union building. An added feature was the special program presented by the Purdue university concert choir under the direction of Albert P. Stewart.



WHERE HIGH PRESSURE MUST BE CONTROLLED

When oil drilling encounters pressures of several thousand pounds per square inch, there must be no "ifs" or "buts" about the blow-out preventer's capacity to hold things in check. In one particular type of blow-out preventer (6000-pound test), thrust screw and head bolts play a vital part in preventing accidents and waste. They are made of Chrome-Moly (S.A.E. 4140) steel because:

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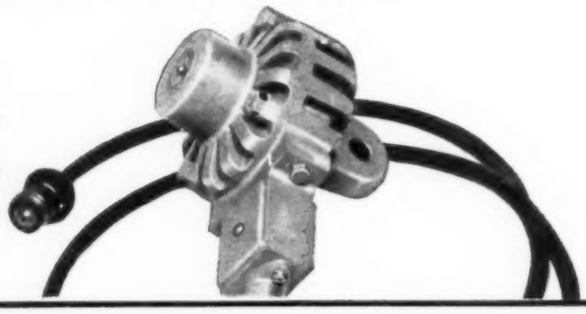

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No. 1—Light match plate work	$10.00
No. 2—Medium match plate work	13.00
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Third (ground) wire per U. S. Govt. code—furnished with No. 9 at no extra cost; $1.00 extra with Nos. 1, 2 and 5 vibrators.

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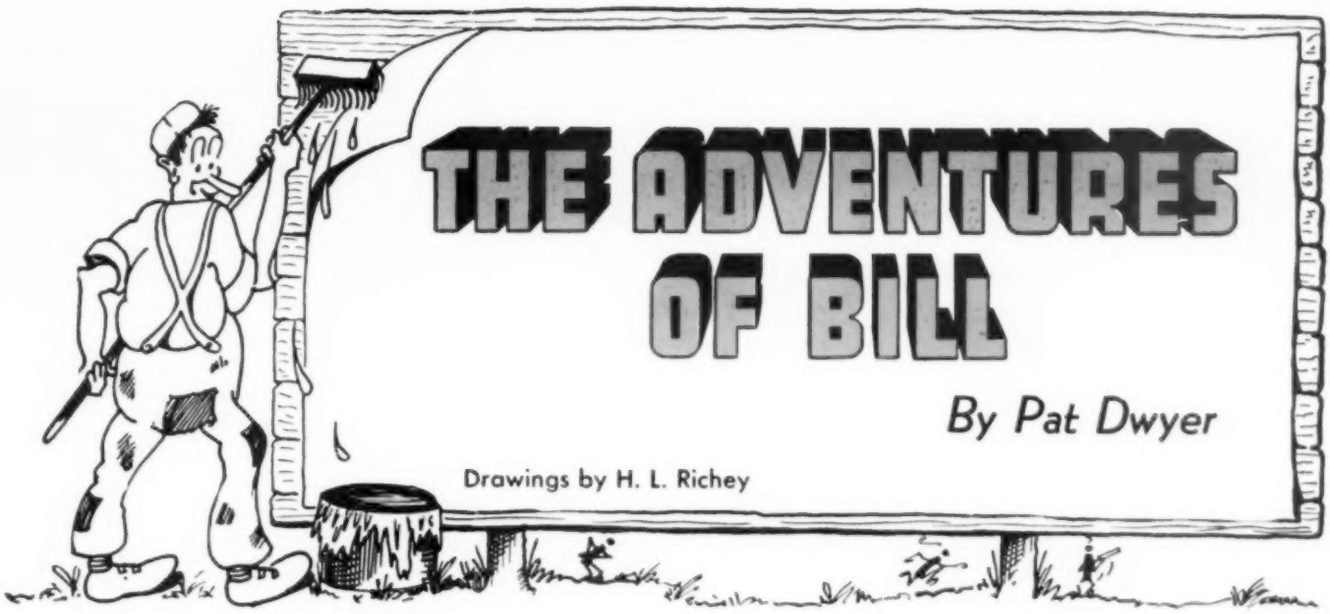


THE ADVENTURES OF BILL

By Pat Dwyer

Drawings by H. L. Richey

CONSIDERING that the stuff is free—stuff is as good a name as any other although Bill with his foundry training and background insists on using other terms—considering that the stuff is free, I suppose one has no legitimate cause for grumping and growling over a radio program. If he does not like it he can turn a knob and shut it off. Undoubtedly if one is satisfied to live alone and like it, he can twiddle the knobs, or preferably he can carry the contrivance up to the attic and leave it there as a cozy little nest for the mice and the spiders.

Unfortunately the average citizen whether he likes it or not, does not live alone. He either grinds his teeth and accepts the programs selected by other members of the family, or he seizes hat and coat and vanishes into exterior darkness. The vanishing act presents many attractive features in the spring, the summer and the early fall. The prospect loses a great deal of its appeal on a winter night with the thermometer hovering around zero and with a piercing gale whistling in from the lake. A gale filled with glass hard powdered snow picked up originally in the great waste land north of Hudson bay and accelerated in speed and intensity over every mile of the journey. The prospect is even more discouraging when Jupiter Pluvius swings the watering can on high Olympus and drenches streets and houses in driving sheets of rain. In the face of either of these conditions, or of others which easily come to mind and therefore need not be enumerated, one naturally hesitates in deciding which is the lesser of the two evils, listening to a tripey program or running the risk of being drowned or frozen. An appeal to Bill had rather astonishing results.

"Well," he said, "I'll tell you. Tastes differ of course. A program that is honey and ambrosia to one person may be pure rattle snake poison to another. Take f'instance these here now quizzy programs where a bird takes half a dozen victims and verbally strips them in front of a nation wide audience. Before putting the bee on each one he makes the poor squirming creature disclose his or her name and address, business if any, marital standing, past history, shoe and hat size, birth marks, number of toes on each foot, price of suit, what he had for breakfast and any other impudent remark that comes to mind, remarks that arouse hilarity in the audience at the expense of the victim at the mike on the platform.

Honest citizen enters a mild protest

"Then comes the question, professedly designed to test the intelligence and general knowledge of the party of the second part. Generally a sorry exhibition. Grown up men and women muff the answers to questions that should not puzzle any person who has gone through grade school. In proof of this statement, if proof is needed I only have to direct your attention to the fact that when the party in front of the mike admits that he or she does not know the answer, the interrogater turns to the audience and every one shouts the answer in a mighty chorus. What's that? He holds up a card with the answer printed on it? Do you know I often have wondered about that.

"However, as I was saying, the whole thing is kind of moronic and amateurish and I listen only when I am absolutely driven into a corner and cannot escape. On a recent program the question was: Who was Paul Bunyan? If there is any bit of American folk lore more familiar than the exploits of Mr. Bunyan and his famous blue ox Babe, I have yet to hear of it. One giggling woman admitted that she was not quite sure, but she thought he had written a book or something one time. A gent with a decided lower Manhattan accent confidently claimed that Paul Bunyan was the name of a boid who flourished in Philly about the toin of the century. A kind of a doctah. He invented several patent medicines and adve'tised even mo' extensively than Lydia Pinkham. Yoosta have a pictsha of himself in every ad with one arm sticking straight out in front, fist closed with the exception of the index finger pointing straight into the

reader's eye. Instead of putting fancy names on his various remedies he simply numbered 'em. Lower numbers for the common afflictions of mankind and increasingly higher numbers as the conditions became more severe and complicated. If I remember correctly No. 71 was practically guaranteed to restore full life and energy to a wasted and emaciated body if taken before actual rigor mortis set in. Hot stuff!

"Talking about Paul Bunyan," Bill continued, hopping nimbly from one subject to another "talking about Paul Bunyan the greatest lumber man of all time, reminds me of something I came across in Saginaw, Mich., last summer."

"Seems to me," I said, "That some of Paul's exploits occurred up in that part of the country. He was in a hurry one time and could not wait for his crew to cut down a 40 of standing timber in the usual manner. He ran a big chain around the section of forest, hitched Babe to the free end of the chain and pulled the whole thing down in one mighty wrench. I suppose you will be telling me next that while you were prowling around Saginaw this summer you found this chain coiled up in a foundry scrap yard. The cupola man goes out every day and whacks off a few links and at the present rate of consumption anticipates that he will not need to buy any more steel scrap for at least 20 years."

"No," said Bill. "I did not see the chain. Neither did I see the yoke, the traces, the shoes or any other relics of the famous blue ox Babe. three axe handles and a plug of tobacco across the forehead. I do not think Paul left the chain in Saginaw. 'Twas forged for him by a skilfull Yankee blacksmith while Paul still was in his teens, slashing his way through the forest of Maine and filling the Penobscot and Androscoggin with logs to such an extent

The whole town looks up to him

every spring that the fish developed little short legs with which to crawl up stream on the bottom of these rivers.

"With Maine polished off to his liking, Paul and his ramping, stamping crew of burlers and bully boys went through the forests of Michigan. Minnesota and Wisconsin like the devil went through Athlone in three standing jumps. The last jump took him over the mountains and into the giant trees of the Pacific coast where the skookum chain came in right handy for lifting real trees from the mountain side to the saw mill. Maybe and probably is there yet unless some enterprising patriot picked it up and sold it for scrap to the Japs.

"Bright, bustling, progressive modern American Saginaw today bears no resemblance to the Saginaw of the old lumbering days when it was known as the toughest town in Michigan and therefore the toughest in the United States. Smooth streets and sidewalks have replaced the planks regularly cut to splinters by the calked shoes of a ranting roaring mob of wild men of the woods who descended on the town at regular intervals, drank up all the liquor in the place and entered and left the buildings as frequently through the windows as through the doors irrespective of whether the aforesaid windows and doors were closed or open. Tough, hard, hairy men, they played a homeric part in one phase of American development and then followed Paul Bunyan toward the sunset. Like the flowers of the forest they faded away."

"If you saw no relics of Paul and the Babe," I inquired as politely as possible under the circumstances. "If the tough hombres are gone and all the blood washed up, then in the name of holy old Mackinaw what *did* you see? I assume," still ponderously polite "I assume both of your eyes were in good working order, wind shield wiper functioning properly and all that kind of thing. Don't ask me to guess I'm tired."

"You would not guess in 40 years. I discovered a bronze or copper statue—I did not get close enough to scratch it—a statue with probably a more curious history than any other in this country. It was erected about 50 years ago and rated head lines in all the newspapers. Fame is fleeting. Out of about a dozen people from whom I sought information, approximately one half claimed they never had seen the object. The others admitted that they had seen it, but only had faint and fragmentary ideas of what it was or by whom it was erected. Once I start a job I like to finish it. I cast around in a larger circle, wrote letters here and there and finally collected all the available dope."

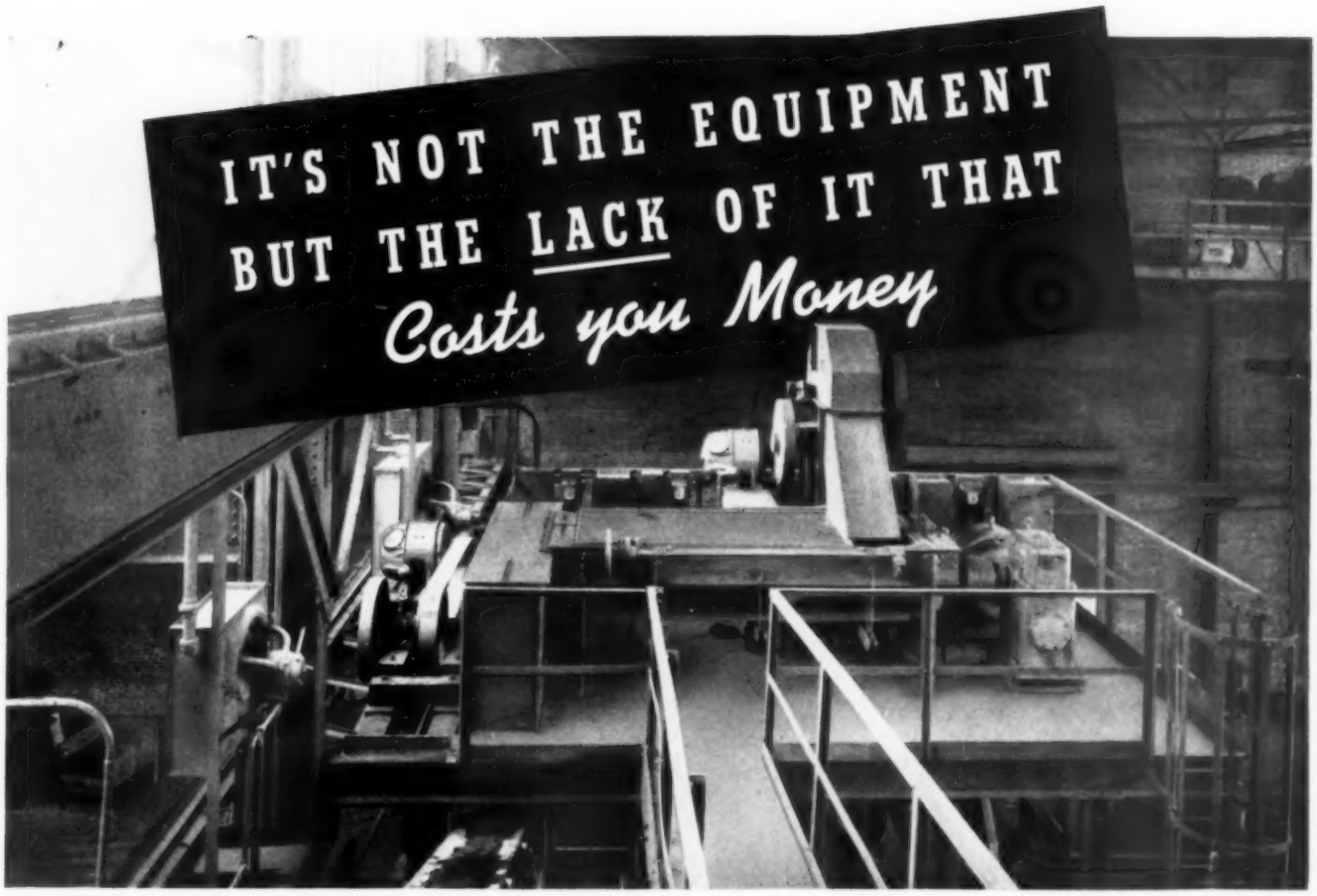
"Don't tell me," I said. "'Twas a statue of the one and only Charlie McCarthy!"

"Well, no. Now that you bring the little blighter's name into the discussion I can see several points of resemblance between the two characters, ostentation, love of the limelight and supreme self confidence. Even on a physical basis they were not so far apart. The original of the statue, Little Jake Seligman, in his highest heel shoes extended upward from the state of Michigan only for an extreme distance of four feet four inches. Mentally and in the field of finance he was a giant.

"No person seems to know whether he was brought by the stork, or came under his own power, but he appeared in Saginaw in 1871 and opened a clothing store. Through unique advertising methods the store prospered to an unusual degree. He tossed coins from a sec-

(*Concluded on page* 76)

Connoisseurs take a gander and weigh relative merits of objets d'art



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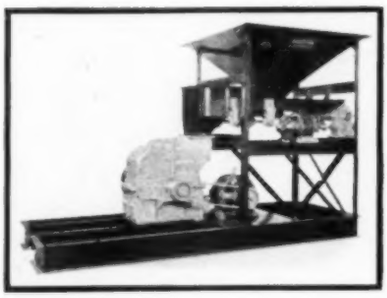

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SAND HANDLING AND SAND CONDITIONING EQUIPMENT
MOLD CONVEYORS AND ACCESSORY FOUNDRY EQUIPMENT

VIEWING Foundry Developments AT SHORT RANGE

ONE steel foundry making castings for the oil refining industry finds that skin dried molds give excellent results. That practice permits use of a weak and extremely permeable sand with a strong mold wash to give a smooth hard surface which resists penetration and thermal attacks much better than green sand. The skin dried mold does not offer near the resistance to contraction that the baked dry sand mold does. It also is claimed to provide lower costs, greater speed, less expensive equipment, ease of shaking out, etc.

* * *

A new non-corrosive soldering flux for brass, tin, bronze and copper has been designed for fast soldering on a mass-production basis. It is said to penetrate the joints thoroughly and quickly.

* * *

An alloy cast iron used for dies to stamp stainless steel parts with excellent results contained 1.25 to 1.40 per cent silicon, 0.70 to 0.90 per cent manganese, 2.50 to 3.00 per cent nickel, 0.60 to 0.75 per cent chromium, and 3.10 to 3.30 per cent carbon. The dies were heat treated at 1550 to 1600 degrees Fahr., quenched in oil, drawn at 600 degrees Fahr., and air cooled to obtain a brinell hardness around 400.

* * *

ADDITION of relatively small amounts of thorium to heat resistant alloys such as those containing 65 per cent iron, 30 per cent chromium and 5 per cent aluminum is said to increase their life considerably, according to a recent patent. Addition of 0.05 per cent thorium increased life of that alloy 2½ times; 0.10 per cent thorium increased it 3½ times while addition of 0.50 per cent thorium increased life 7 times at high temperature.

* * *

In general, determination of the cause of an unsound or inferior nonferrous casting will result from careful study and consideration of the following six questions: Are you using the proper alloy for the casting job at hand? Is the metal being melted down and poured at the proper temperature? Is the proper flux being used? Is the mold practice correct (gating, risering, venting, etc.)? Is the proper sand used? Are the cores properly made?

* * *

CAST iron for enameling should have a high silicon, phosphorus, and total carbon content. Manganese and sulphur contents should be moderate and that of combined carbon low. The most satisfactory compositions contains approximately 2.50 per cent silicon, 0.70 per cent phosphorus, 0.60 per cent manganese, 0.08 per cent sulphur, and 3.40 per cent total carbon.

* * *

A southwestern foundry has obtained excellent results from the installation of a continuous carbon dioxide gas determinator in the cupola stack. By observing the gas composition as indicated by the apparatus, the cupola operator can adjust his blast volume to secure the best results.

* * *

No cooking or thinner is said to be required for a new polishing wheel adhesive which comes in three consistencies for grains finer than 200; from 100 to 200, and coarser than 100. It sets rapidy under heat it is claimed but remains permanently flexible under friction heat generated in operation. When grain is worn from the wheel, the size coat glazes and prevents wearing or burning the wheel material.

* * *

ADDITION of a considerable quantity of iron to a copper-zinc-aluminum alloy is claimed to give great hardness and strength according to a recent patent. The iron also is said to decrease the tendency of aluminum-zinc alloys to diminution of strength under elevated temperature. Suggested composition is 8 per cent copper, 8 per cent zinc, 6 per cent iron and remainder aluminum. The alloy may be used for bearing bushings, guides, pistons and in machinery subject to sliding motion.

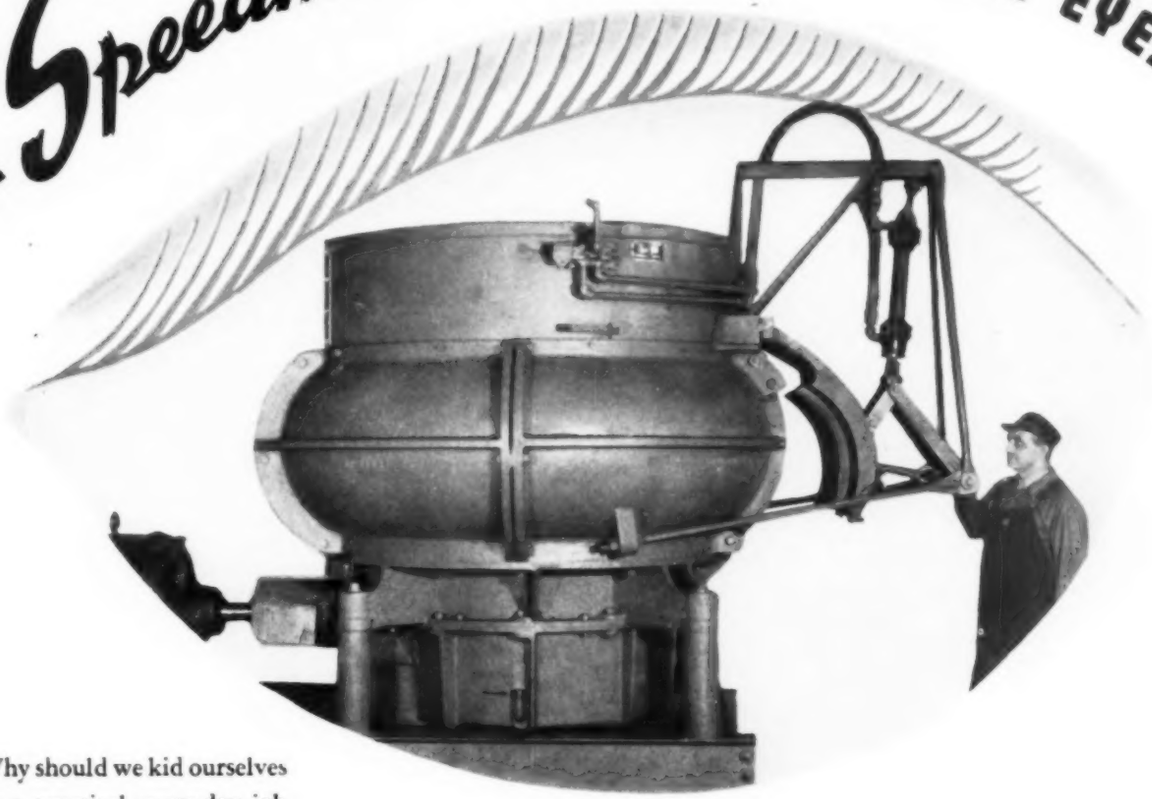
* * *

Addition of molybdenum to a composition for some large gray iron gears for rubber mill drives gave good results. The gears weigh over 3000 pounds, and are 64 inches in diameter with a 12-inch face. The final composition of the iron employed was 1.90 per cent silicon, 0.70 to 0.90 per cent manganese, 0.75 per cent molybdenum, and 3.20 per cent carbon.

* * *

MIDDLEWESTERN firm is manufacturing various types of valves for severe service in which the plug-type disks are made of a nickel alloy, and the seats of heat treated chromium iron. That combination of metals is said to possess excellent resistance to wear, temperature, galling and scoring.

THE *Speedmullor* WILL OPEN YOUR EYES



Why should we kid ourselves about such a practical every-day job as sand mulling when the *Speedmullor* will produce facing, backing and core sands in exact accordance with predetermined specifications? Meet every sand mixing need in less time, at lower cost per ton mulled, and with unvarying consistency.

These facts are proved and amplified every day in production and jobbing foundries. A. F. A. Standard Testing Equipment is the judge; America's most critical foundry sand experts form the jury of eye witnesses. As fast as the *Speedmullor Caravan* travels from one shop to another, the foundry industry is seeing sand mulled, as it should be mulled to produce castings with satin-smooth surfaces. There's no kidding about that — seeing is believing.

That's why we say the *Speedmullor* will open your eyes by showing you in your shop, on your sand, just why and where it leads the field on each of the following counts.

THE BEARDSLEY & PIPER *SPEEDMULLOR*

1. **Unconditionally guarantees high quality, low temperature sand.**
2. **Assures sand that is more uniformly bonded, tempered and aerated.**
3. **Discharges instantaneously; 5 seconds or less.**
4. **Installed without special foundation.**
5. **Uses less power per ton of sand mulled.**
6. **3-Point Lubrication.**
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Do not accept our word for *Speedmullor's* sensational performances. We stand ready to prove our every claim beyond the shadow of a doubt Return the coupon for complete "see before you buy" information.

The BEARDSLEY & PIPER Co.
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THE BEARDSLEY & PIPER CO., 2541 N. Keeler Ave., Chicago, Ill.
Gentlemen: We want to "see before we buy." Kindly send us at once complete information on *Speedmullor's* sensational on-the-job performances.

Company _____

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ACTIVITIES OF FOUNDRY GROUPS

Northern California

THIRD birthday party of the Northern California chapter was held at the Sequoyah Country club, Oakland, Calif., on Oct. 21. Feature of the party was a golf tournament held under the direction of Ed Welch, official handicapper. Twenty-five prizes were distributed by Harry Parrock and Phil Kellogg to the lucky winners at the dinner which followed in the evening. Wesley Schimmelpfennig and Pete Valentine staged a hectic golf game with one club between them—with Wes winning the prize. While George Kennard did not participate in the golf game, he was remembered with a fine, pear-handled penknife. Emory Smith, professor emeritus of chemistry and physics, Stanford university, was a guest. Entertainment committee in charge of arrangements was composed of Al Snow, chairman, Jack Spillane, Harry Bossi, and Edgar Wilcox.—*George Kennard, secretary.*

Twin City

AN AFTERNOON inspection trip through the plant of the National Bearing Metals Corp., St. Paul, inaugurated the 1938-39 season of the Twin City Foundrymen's association. Thirty-nine members and friends were conducted through the plant by H. E. Conners, manager. The entire plant was in full operation, featuring the cupola melting of brass, permanent mold casting and the operation of a conveyor system for handling of molds.

The trip was followed by a dinner at the Commodore hotel, St. Paul. After dinner the meeting was presided over by H. H. Blasjo, Minneapolis Electric Steel Casting Co., Minneapolis, and president of the association. After routine matters were taken care of, Mr. Conners discussed briefly the operation of the National Bearing Metals plant and answered questions presented from the floor.—*O. W. Potter, secretary.*

Philadelphia

CHAIRMAN Harold Henzsey presided over the regular meeting of the metropolitan Philadelphia chapter of A.F.A., Oct. 14, in the Engineer's club where 125 members heard Dr. H. L. Maxwell, experimental station E. I. Dupont de Nemours Co., Wilmington, Del., discuss castings from a consumer's view point. An illustrated talk on a trip to Hawaii was presented by W. B. Coleman, secretary-treasurer of the chapter.

Dr. Maxwell reviewed the subject of castings in their relation to general use and particularly their use in chemical equipment. Consideration was given to acceptance tests, operating service conditions and types of failure in service. The subject illustrated with 32 slides, was presented in three sections: Plain and alloy cast iron; cast steel; and stainless steel castings.

The speaker stated that cast iron in chemical service usually failed from one of two causes, either surface attack and corrosion encountered in acid service and usually at high temperatures, or, growth in service, the type of failure met most frequently. This growth usually is accelerated by high temperature operating conditions. Structural changes going on within the metal result in an actual permanent increase in dimensions. The most economical method of overcoming these difficulties, according to the speaker, are the use of low silicon iron, or the use of chromium-nickel additions in such proportions as to render the structure and properties throughout the casting uniform. Several illustrations showed service tests on a plant scale had demonstrated the economy of using low silicon and alloy additions.

Reviewing the application of cast steels to chemical equipment the speaker pointed out that the desirable physical properties of cast steels, with their ready adaptability to intricate design, make this class of materials desirable and economical for a wide variety of chemical

(*Continued on page* 59)

Northern California chapter celebrated its third birthday with golf and dinner party

ROOTS POSITIVE BLOWERS HAVE PROVED THEIR WORTH ON MANY FOUNDRY CUPOLAS

Built so well 45 years ago that we get no replacement business

THE NEWBURY MFG. CO.
PIPE FITTINGS
SCREWED-FLANGED-BELL AND SPIGOT
PLUMBING SPECIALTIES-CASTINGS
TALLADEGA, ALA

October 27, 1938

Roots-Connersville Blower Corporation
Connersville, Indiana

Gentlemen:

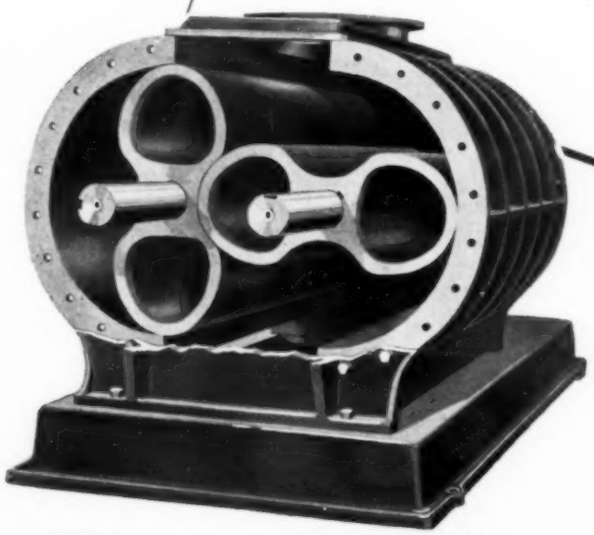
We have your letter of October 24th. As we have written you before, we want to say that the writer does not expect to live long enough to ever need another blower.

We have as you know three of these of your make. We bought one in 1893, one in 1900, and one in 1905. They are all going strong, and as well as they did when they were new. We are great believers in this type of blower, and could never see why any one uses any other type.

Yours truly,
THE NEWBURY MFG. CO.
H. A. Newbury

HAN:SS

Roots Blowers are built better today than ever before

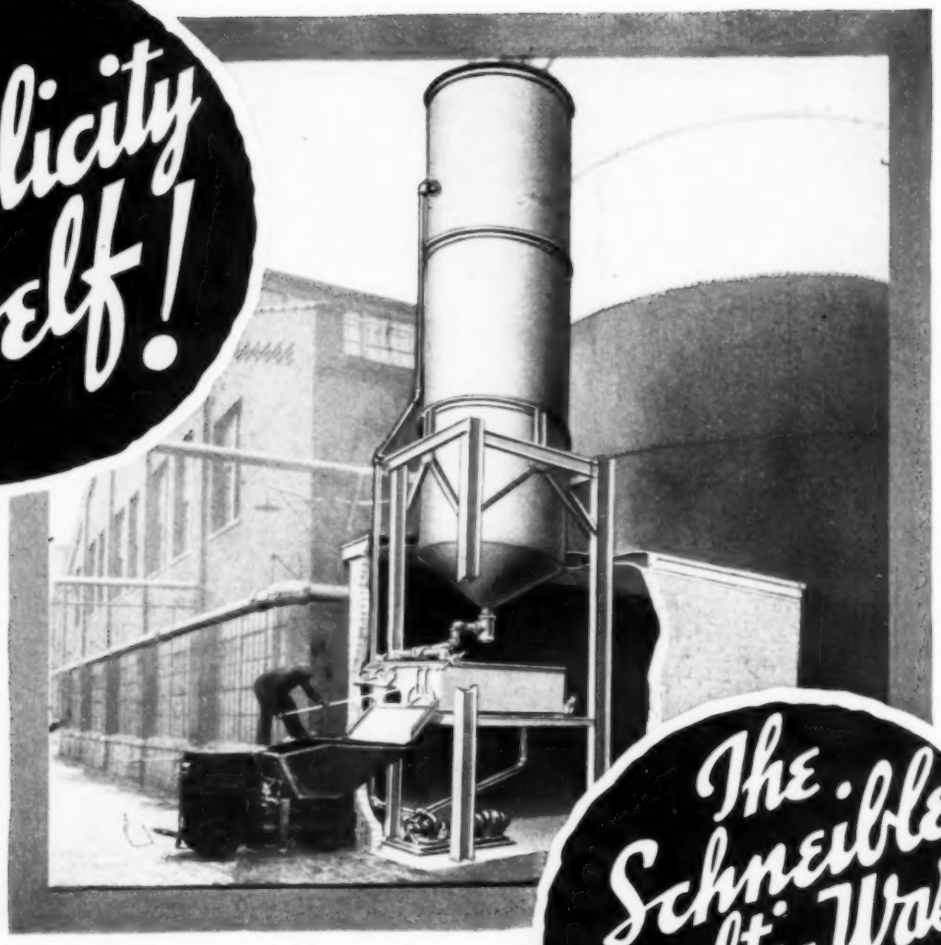


The positive displacement principle as first used in the Roots Blower is still superior for supplying dependable, low-cost air to the foundry cupola. Scientific foundry control calls for air adjustments that can best be secured with the Roots Blower – either with manually operated or fully automatic controls.

Roots CONNERSVILLE BLOWER CORPORATION • CONNERSVILLE, IND.

NEW YORK • CHICAGO • POTTSTOWN, PA. • PITTSBURGH • BOSTON • DETROIT • ST. LOUIS • SAN FRANCISCO • LOS ANGELES

Simplicity itself!



The Schneible Multi-Wash Dust Collector

The Schneible Multi-Wash is the simplest dust collector built. Simplest in design and operation. Simplest to install. Simplest to maintain.

It uses no bags, screens or filters; no moving parts, no shakers; no nozzles to clog; nothing to wear, break, burn or freeze.

Its simplicity accounts for its low operating cost. It can be cleaned without shutdown. It can be installed anywhere inside or outside the plant and requires less space than ordinary, more complicated dust collectors.

Hundreds of installations in ferrous and non-ferrous foundries, large and small, prove the efficiency of the Schneible Multi-Wash System. Every foundry collector is protected against repairs or replacement of parts by a five year guarantee — the simplicity of the Schneible Multi-Wash makes this possible.

Send for Bulletin 110 which explains how the efficiency of the Schneible Multi-Wash is brought about by its simplicity.

Many of America's Largest Foundries Use Schneible Multi-Wash Dust Collectors!

CLAUDE B. SCHNEIBLE CO.

DUST SUPPRESSION ENGINEERS

3951 LAWRENCE AVENUE, CHICAGO OFFICES IN PRINCIPAL CITIES

(*Continued from page 56*)

equipment services. Large cast steel heads for autoclaves and other reaction vessels have proved satisfactory in a variety of designs. He anticipated extensions to cast steel applications in chemical equipment.

Stainless steel castings were discussed from the point of view of composition and heat treatment and particularly how these factors influenced their economical life in service. Special emphasis was placed upon the development of grain boundary attack in stainless steel castings not properly heat treated.

The speaker stated that in a number of applications the high corrosion rates of stainless alloys in the as cast condition have been reduced to an acceptable rate permitting their use in chemical processes by quenching in water from 1950 to 2000 degrees Fahr., to absorb the grain boundary carbides. A number of specimens were exhibited to demonstrate the effect of proper heat treatment as influencing the life of stainless steel castings in chemical process service.—*J. T. Fegley, director.*

Metropolitan

THE Holley permanent mold process was described by Edward C. Hoenicke, vice president, Eaton-Erb Foundry Co., Vassar, Mich., at the regular monthly meeting of the Metropolitan New York-New Jersey Chapter of the A.F.A. held at the Essex House, Newark, N. J., on Nov. 7. About 70 members and guests were present. Previous to Mr. Hoenicke's talk Chapter Chairman Don J. Reese announced that a joint committee of the Metropolitan New York - New Jersey, and the Metropolitan Philadelphia chapters is arranging a regional meeting to be held April 1, 1939 at Rutgers university, New Brunswick, N. J.

Mr. Hoenicke said that the permanent mold machine used by his firm consisted essentially of a revolving table containing 12 molds. The metal molds are given a thin clay coating, blacked with an acetylene flame, poured and freed from the castings in a cycle which takes from 2 to 6 minutes. The castings are in the mold from 40 to 120 seconds, and the cycle is timed so that the molds are preheated automatically by the castings to 500 to 700 degrees Fahr. All castings are given an annealing treatment for 3½ hours to relieve strains and decompose any iron carbide. That results in a ferritic matrix which is said to result in increased machining rates and tool life.

Molds can be used for 3000 to 10,000 pourings. Except for additions of small amounts of nickel and molybdenum to prevent surface cracking, the molds are made from the same iron employed for the castings, and which contains 3.50 per cent total carbon and 2.50 per cent silicon. Mr. Hoenicke pointed out that a total of 28,000,000 permanent mold castings made by his company last year were employed in the automotive, refrigeration, washing machine, and other industries. The talk was illustrated with numerous slides, and was followed by a lively discussion and inspection of some 25 permanent mold castings.—*K. A. DeLonge.*

Northern Illinois

NORTHERN Illinois and Southern Wisconsin chapter of the A. F. A. regular monthly meeting was held in the plant cafeteria, Fairbanks Morse & Co., Beloit, Wis., Oct. 4, with John Clausen in the chair. Through the courtesy of the management, the members were taken for a tour through the Beloit plant and shown many interesting features in the construction and erection of diesel engines from the pattern shop to the testing block.

Before the meeting was called to order for the technical session, John Bing, A. P. Green Firebrick Co., Milwaukee presented a two reel motion picture taken this past summer while on a trip through Mexico. A bull fight was included in the many interesting features shown on the screen.

Physical properties of cast iron in heavy sections was the subject of a paper presented by E. R. Young, Climax Molybdenum Co., Chicago. He showed and described the microstructure needed for high strength irons and the means employed for controlling the physical properties. The presentation was based on results obtained from a series of 2-inch diameter test bars poured from a variety of iron combinations. A lively discussion followed the presentation of the paper.—*Henry C. Winte, technical secretary.*

N. J. Nonferrous

THE first fall meeting of the nonferrous division, New Jersey Foundrymen's association, was held at the Essex house, Newark, N. J., Oct. 19. The following officers were elected: President, Philip Zusi, Edward A. Zusi Co.; vice president, Thomas R. Williams, E. A. Williams & Son; treasurer, William D. Goldsmith, C. A. Goldsmith Co.; secretary, John L. Carter. Hubert F. O'Brien, A. P. Smith Mfg. Co., was added to the board of directors.

Henry Hecht, general manager, Alloys & Products Inc., New York, gave an interesting talk on "Recent Trend in Nonferrous Alloys and Their Effect on Foundry Ills." Mr. Hecht had collected some interesting figures showing that in the aluminum, copper and nickel base categories, there were now a total of 138 commonly used standard compositions, 557 varied specifications and 806 proprietary or trade marked names for various compositions.

This multiplication of specifications and proprietary names has led to considerable confusion in the field of nonferrous alloys. Many of these compositions fill a definite need, but often their production requires a degree of material and melting control which the average small brass foundry lacks, and many cause trouble in other mixtures if the scrap is not segregated carefully. Buyers of castings who specify compositions or proprietary names put the conscientious foundry at a disadvantage against competitors who do not hesitate to cheapen their product by cheating on analysis. Mr. Hecht's conclusion was that some standardization is urgently needed in the field of nonferrous alloys—*John L. Carter, secretary.*

Reading

TWENTY-ONE members attended the regular October meeting of the Reading Foundrymen's association, held at the Wyomissing club, Reading, Pa., and presided over by J. B. Greenstreet, Textile Machine Works, Reading, Pa., and president of the association. A talk on "Dust Control in Foundries" was presented by Lee C. Wilson, general manager, Reading Steel Casting division of American Chain & Cable Co. Inc., Reading, Pa. Problems arising from the control of dust hazards in the foundry, the prevention of silicosis among foundry workers, and the effects of new compensation laws and insurance regulations covering occupational diseases upon the foundry industry were ably discussed by Mr. Wilson. His experiences with these matters in other states where similar laws have been in effect for some time previous to those in Pennsylvania were very interesting to those present. It was agreed that this talk was one of the most informative on an important subject that has been presented before the group for some time. This would indicate that the association has some fine speakers within its membership and that more talks will be given by its members.

The nominating committee is to meet for the purpose of nominating officers for next year. The entertainment committee is planning an entertainment to follow the annual meeting next month. Several prospective new members dropped in and there are many indications that the steady growth of the association will continue. The interest of the

new members in the activities of the association is most gratifying and the coming season promises to be a bigger and better one for the Reading Foundrymen's association. —*H. C. Cummings, secretary.*

St. Louis

REGULAR meeting of the St. Louis district chapter of the A. F. A. was held Oct. 13 with Vice Chairman Lee E. Everett presiding. R. Stifel, chairman of the membership committee, announced the following applications for membership: Al. J. Struel, Key Co., East St. Louis, Ill., and A. H. Woerheide, American Pattern & Model Co., St. Louis. A cordial welcome was given the new members.

Upon proper motion and second, the chapter voted to hold another regional conference at the Missouri School of Mines and Metallurgy during 1939.

The meeting was then turned over to Webb L. Kammerer, chairman of the program committee who introduced the speaker of the evening, A. C. Weber, who presented a picture of the Laclede Steel Co., entitled "Making of Steel." After the showing of the picture, the meeting adjourned and organized discussion groups in steel and gray iron.

The St. Louis chapter of A.F.A. held its regular meeting on Nov. 10 in collaboration with the David Ranken Jr. School of Mechanical Trades at the school.

In the absence of J. O. Klein, chairman, L. E. Everett, vice chairman of the chapter, opened the business session which took place after a fine dinner served by the boys of the school. After various reports had been given, the meeting was turned over to C. R. Culling, chairman of the apprentice training committee, and under whose auspices the evening's program was presented.

Mr. Bass, director of the school, gave an outline of its history and explained in detail the school's plan of enrollment, training, and plant co-operation. T. Ross, also of the school, presented Stanley Brah, International Correspondence Schools, who gave a fine talk on apprentice training, outlining many proved plans as well as commenting on the application of the wage and hour act to the trade.

During the evening, it was announced that the 1939 technical conference to be held at Missouri School of Mines and Metallurgy, Rolla, Mo., would be under the able chairmanship of L. J. Desparois, Pickands, Mather & Co., who has handled the committee work so well during past years. Others on the committee are: George Mitsch, American Car & Foundry Co.; C. R. Culling, Carondelet Foundry Co.; L. C. Farquhar, American Steel Foundries; Carter Bliss, Scullin Steel Co.; Webb Kammerer, Midvale Mining & Mfg. Co.; John W. Kelin, Federated Metals division of the American Smelting & Refining Co. The annual Christmas party will be held Tuesday, Dec. 13 at the York hotel with vaudeville, music and dinner.—*John W. Kelin, secretary.*

Northern Iowa

CLEANING of castings featured the discussion at the regular meeting of the Northern Iowa Foundrymen's association, held at Waterloo, Iowa, Tuesday, Oct. 25. E. A. Rich, Rich & Son, Chicago, representative of the American Foundry Equipment Co., Mishawaka, Ind., described the principles of the continuous cleaning unit which uses the mechanical centrifugal propulsion of blasting material. It was pointed out that in this method all the blast particles are propelled with the same velocity.

The speaker showed a motion picture illustrating in detail the complete manufacture of the unit, and typical sizes and installations. In a second film, the units were shown in operation in various shops.

For the second part of the meeting, Mr. Rich presented two very entertaining films in technicolor taken on several successful fishing trips along the northern shore of Lake Superior, and in Maine. The fishing shown was the kind every real fisherman dreams about but only a fortunate few encounter.—*R. E. Wilke, president.*

Southern California

INTERESTING variety of subjects was presented by three prominent speakers at the regular monthly meeting of the Southern California chapter of the A. F. A., meeting, Oct. 27 in the Clark hotel, Los Angeles. John H. Hanson, chief agent federal bureau of investigation, Los Angeles, described the work of his department. J. Stewart Neary, prominent attorney spoke on the "Relationship Between Management and Employes as Affected by the National Labor Relations Act." He claimed that the act was here to stay and although it probably will be amended from time to time, management should realize that it is the law and govern itself accordingly. He advised the appointment of a grievance committee in each plant to meet with the management and discuss any unsatisfactory conditions. A campaign of education is necessary to acquaint employes with the problems of management. Referring to the wages and hours law effective Oct. 24, he stated that he believed it would prove to be unconstitutional. However, until this point is determined management should not risk a violation.

Robert M. Ryburn, safety engineer, Hollingsworth Co., described foundry safety practices and devices. He emphasized the fact that any foundry safety program started with good housekeeping. Wherever a foundry had good housekeeping, a good safety record with accident hazards at a minimum followed as a natural sequence.

Robert Gregg, Reliance Regulator Co., chairman of the education and apprenticeship committee announced that negotiations were under way with the Los Angeles school board to make available an apprentice training course one or two nights each week at the Manual Arts high school. The meeting was presided over by J. G. Coffman, chapter chairman and was entertained with several songs by Senor Acosta.

Chairman Coffman appointed the following committee to handle arrangements for the first annual joint

(*Continued on page* 62)

Several officers of the Quad City Chapter of A. F. A. at the recent Iowa City regional conference. From left to right: Hy Bornstein, Deere & Co., Moline, Ill., director; Horace A. Dean, Deere & Co., Moline, Ill., vice chairman; M. J. Gregory, Caterpillar Tractor Co., Peoria, Ill., chairman; A. E. Hageboeck, Frank Foundries Corp., Moline, Ill., director and past chairman

Definite Insurance against defective castings

A percentage of Superior Charcoal Pig Iron in the mix helps you keep old customers and win new ones.

NOTHING is as good for a foundry as satisfied customers. And the more perfect castings you sell your customers, the better satisfied they'll be. That's why so many foundries are using Charcoal Pig Iron in the mix as a definite insurance against turning out defective castings.

By including at least 15% to 20% of Superior Charcoal Pig Iron in your mix, the castings you produce will be stronger, tougher, longer-lasting. They'll be denser, more uniform, easier to machine and will in turn make a higher quality finished product.

The insurance against defective castings which Superior Charcoal Pig Iron gives you is well worth the few cents extra cost. It will pay you dividends because of fewer rejections, less scrap loss, and really satisfied customers. And by turning out better castings you take a long step toward winning new customers.

If you are not now a user of our "ANTRIM" and "NEWBERRY" Brands, why not write for prices and let us recommend a grade that will improve your mix.

You can use Superior Charcoal Pig Iron as the extra cost is negligible.

SUPERIOR CHARCOAL IRON COMPANY
Grand Rapids, Michigan

Superior Charcoal Pig Iron

(*Continued from page* 60)

meeting with the local chapter of the American Society of Metals to be held Feb. 16, with a program which will feature "Casting Aluminum and Aluminum Alloys": John Wilson, Climax Molybdenum Co., chairman; Ed Green, Axelson Mfg. Co. and S. R. Kimberly, Los Angeles Steel Casting Co.

Announcement was also made by G. W. Merrefield, Kay-Brunner Steel Products Inc., chairman of program committee, that tentative plans are being made to hold the Southern California chapter's first annual technical conference at the University of Southern California, Los Angeles, or the California Institute of Technology, Pasadena, on March 24, 1939. It will include technical session in the morning and afternoon with separate groups on steel, nonferrous and gray iron. Joint luncheon at noon with conference dinner in the evening, taking the place of the March dinner meeting.—*M. S. Robb, secretary.*

Ontario

AT THE second meeting of the Ontario chapter, Toronto, held on Oct. 21, M. McGuire, George S. Pettinos Inc., Philadelphia, spoke on, "Trouble Shooting in the Foundry" to a group of over 100. He gave advice on almost every phase of foundry operation from pattern design to casting finishing. Suggestions were based primarily on gray iron experience, but many were applicable to steel and nonferrous operations.

Design is one of the most important factors in production of castings free from warping, shrinking and cracking. Proper design insures economical, sound products, and contributes to better appearance, a characteristic that is becoming of vital importance in many applications. Probably 50 per cent of the castings lost in the foundry are the result of poor gating and pouring. Correct arrangement of gates will prevent slag and dirt entering the mold. Careful pouring at optimum temperature and at best speed for type of gates and mold will contribute to production of sound castings.

Natural and synthetic sands are used successfully. Equipment and methods for 3 different systems of molding were discussed. Hydraulic cleaning was the principal development mentioned in finishing of castings. Distinct economies in cupola refractories cost may be realized through proper daubing of walls. Mechanical charging has advantages over manual charging. One of the wasteful errors in cupola operation is use of too high a blast in starting. In a lively discussion period, much interest centered in the best methods of operation and maintenance of the cupola. —*S. R. Francis, secretary.*

Buffalo

EIGHTY-FIVE foundrymen met Nov. 7 at Hotel Touraine, Buffalo, the new meeting place of the Buffalo Chapter of the A. F. A., to participate in a joint meeting with the Buffalo Chapter of the A. S. M. Chairman Nelson and Secretary Birdsong of the A. S. M. were at the speakers' table and assisted in handling the affairs of the evening. William J. Corbett, vice chairman of the A. F. A. chapter presided, and called attention to the second Regional Foundry conference to be held at Cornell university, Ithaca, N. Y., on Nov. 25 and 26.

R. G. McElwee, Vanadium Corp. of America, Detroit, was the main speaker of the evening, and presented a talk on high strength cast iron. His talk was extremely interesting, and a lively discussion took place during the question period. Mr. McElwee described the various uses of that type of iron, and explained the alloys which contribute to its versatility. In summing up, he discussed the constitution and properties, naming the principal alloys and the part each plays in the production of high strength cast iron.—*J. R. Wark, secretary.*

Northeastern Ohio

OVER 140 members and guests were present at the regular meeting of the Northeastern Ohio chapter held at the Cleveland club, Cleveland, on Nov. 10. L. P. Robinson, chairman of the chapter presided, and introduced Robert E. Kennedy, national secretary who spoke briefly, conveying greetings of the national office, and calling attention to the next annual meeting of the A. F. A. to be held in Cincinnati May 15 to 18, 1939. Mr. Robinson then introduced E. T. Runge, Cleveland, who delivered a short talk on costs.

Main speaker of the evening was George S. Evans, Mathieson Alkali Co., New York, who discussed refining of cast iron. He pointed out that through the addition of fused soda ash to the cupola and to the mixing ladle, the molten iron is not only desulphurized to an appreciable degree, but also the iron is refined by the removal of inclusions which may be present. Mr. Evans stated that use of fused soda ash in the cupola speeded up combustion and reduced oxidation.

Amount of soda ash used in the cupola ranges from 2 to 8 pounds per ton. If more than that quantity is employed, trouble may ensue from foaming. In the ladle the amount may range from 10 to 20 pounds per ton. The average amount of sulphur removed is around 60 per cent. In addition the physical properties of the iron are increased. Mr. Evans showed numerous slides containing tables, charts, and views of installations where fused soda ash us used. Annual Christmas party of N.E.O. chapter will be held Dec. 14 at the Hollenden hotel, Cleveland. —*Edwin Bremer.*

New England

SIXTY-FIVE members and guests of the New England Foundrymen's association heard R. G. McElwee, Vanadium Corp. of America, Detroit, speak on "New Information Relative to the Use of Certain Elements for the Processing of Iron," at the regular meeting held at the Engineers' club, Boston, on Nov. 9. President Henry A. Jensen presided.

Mr. McElwee modified the subject of his talk somewhat in discussing various high test cast irons. He said that in discussing with engineers specifications for high test iron, it was essential to supply them with information on the material they really wanted. In other words, if good wear was the requisite, the engineer should not necessarily be sold the idea of an iron with high physical values, which may or may not be a better wearing iron. In comparing castings and forgings the speaker pointed out that castings give the best distribution of weight from the standpoint of cost, have an extremely high damping capacity, and excellent wear resistance.

The talk was well illustrated with slides, and Mr. McElwee said that the total carbon content plus one-third the silicon content gives, in most cases a definite tensile strength which could be predicted, as well as values of brinell hardness, transverse load, and Charpy impact resistance. One slide showed that Charpy impact resistance plotted against transverse deflection was a straight line. The speaker also discussed various deoxidizers and their values when added as late additions to metal, and explained that chromium acts as such when used with other deoxidizers. A lively discussion period followed Mr. McElwee's talk—*M. A. Hosmer.*

Detroit

ABOUT 175 members and guests of the Detroit chapter of the A.F.A. gathered Nov. 17 at the Roosevelt hotel, Pontiac, Mich., for the monthly meeting of this group. The meeting was held in Pontiac in honor of J. H. Crawley, foundry superintendent, Pontiac Motor division, and director of the Detroit chapter, who has been most active

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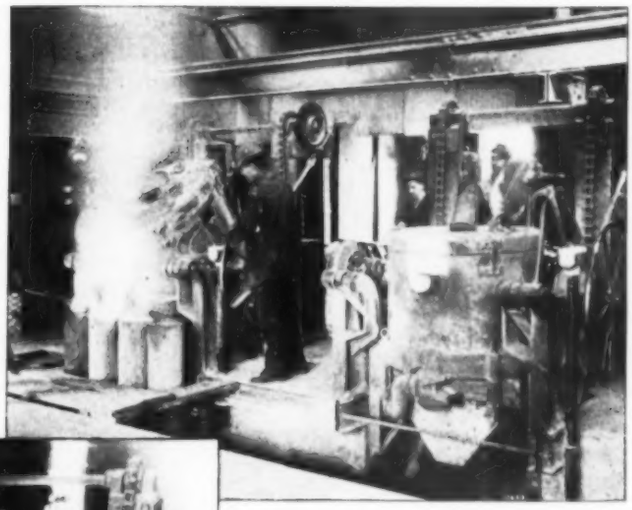
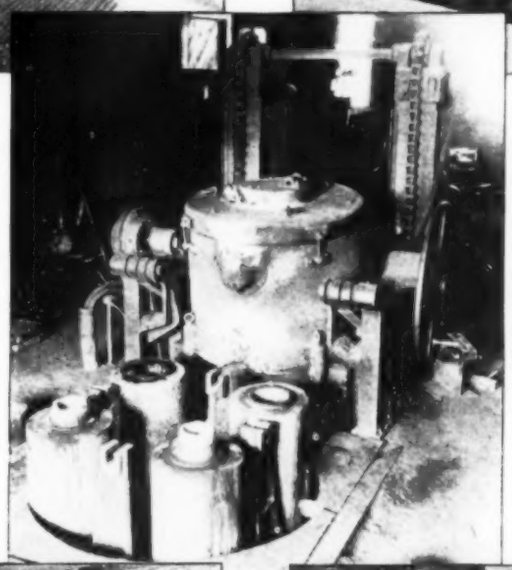
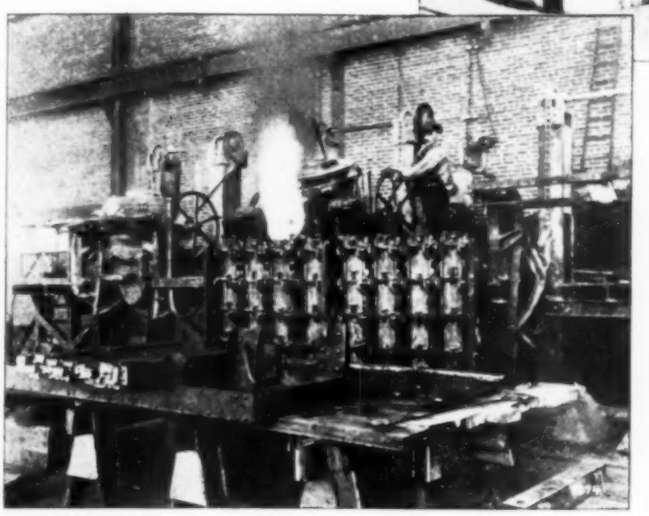
AJAX
WYATT





Submerged Resistor

Induction Furnaces



Ajax Electric Furnace Corp.

DIVISION OF THE AJAX METAL CO.

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ASSOCIATED COMPANIES

THE AJAX METAL COMPANY
Non-ferrous ingot metal for foundry use.

AJAX ELECTRIC CO., INC.
Ajax-Hultgren salt bath furnace and resistance type electric furnaces for all heat treating operations.

AJAX ELECTROTHERMIC CORP.
Ajax-Northrup induction furnaces for melting, heat treating and surface hardening.

(*Concluded from page 62*)

in the chapter's affairs for a number of years.

Nearly 60 of those attending were from the Pontiac foundry, and the meeting proved to be one of the highspots of the chapter's 1938 season.

Feature address was presented by Marshall Post, president of the American Foundrymen's association, and vice president and manager of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., who presented lantern slides and comment on steel castings made by the Randupson process. This method has been introduced to this country only recently and involves the use of air dried cement-bonded sand molds.

Accompanying Mr. Post was C. E. Hoyt, executive vice president of the association from Chicago, who brought greetings from the home office of the society and congratulated the chapter on the excellent turnout for the meeting.

Before Mr. Post's address, Ira F. Cheney, Griffin Wheel Co., Detroit, and chairman of the chapter, introduced J. D. Stoddard, Detroit Testing Laboratory, who in turn presented the well-known chapter member, James L. Mahon, American Car & Foundry Co. As president of the Goodfellows, a Detroit organization of veterans who were former newsboys, Mr. Mahon told of some of the work his group is doing to insure a happier Christmas for thousands of unfortunate youngsters in the Detroit district.—*A. H. Allen.*

Connecticut

FIRST fall meeting of the Connecticut Foundrymen's association was held on Oct. 21 at the Home club, Meriden, Conn. following dinner, J. C. Alberts, Plainville Casting Co., Plainville, Conn., talked on the design, construction and marking of patterns.

Among the points Mr. Alberts brought out was the fact that many patterns present molding problems expensive to both the casting user and the foundry, which, through cooperation of the foundry, designer and patternmaker, could be eliminated. The economy of proper construction and marking was also discussed.

The association decided to send to casting buyers in Connecticut copies of A. F. A. standard pattern colors and markings, and call attention in an accompanying letter to the advantages of standardizing on markings and using a good grade of lacquer paint to prolong the life of patterns.—*H. S. Washburn Jr., secretary.*

New Jersey

OVER 100 foundrymen heard L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland, speak on "Some Common Sources of Core Room Trouble" at the dinner meeting of the New Jersey Foundrymen's association on Nov. 14 at the Downtown club, Newark. President G. W. Hannay, Barnett Foundry & Machine Co., presided.

Mr. Robinson said that for every foundry and class of work there is one best core sand, binder, ratio, moisture content, mixing time, and baking temperature and time. Core room troubles are due to widespread failure to control some of these variables properly. Among the commonest causes of trouble he listed: 1. High moisture. 2. Varying established ratios, often because foundry foreman forces sand mixer to disobey instructions of core boss or superintendent. 3. Inaccurate measuring containers, such as wheelbarrows, cans, etc. 4. Home made ovens with "hot and cold spots." 5. Temperature control by guesswork. 6. Shovel mixing. 7. Core vents not taken off in molding. 8. Poor inspection of cores. Mr. Robinson predicted that some day core ovens would be air conditioned and humidity kept constant.

At the next meeting on Dec. 12, D. H. Montgomery, vice president, New Britain Gridley Machine Co. will speak on "Shall it be Cast or Welded." He will describe his company's experience and present attitude on the relative merits of cast iron versus fabricated steel for machine tool parts.—*John L. Carter, secretary.*

Committee on arrangements of the Wisconsin chapter of the A. F. A. met recently to plan the program for the second annual regional foundry conference to be held in Milwaukee, Feb. 16 and 17. Reading from left to right, William J. MacNeill, Federal Malleable Co.; S. P. Waltermire, Chain Belt Co.; Ralph S. MacPherran, Allis-Chalmers Mfg. Co.; Prof. E. R. Shorey, University of Wisconsin; Charles I. Wesley, Wesley Steel Treating Co.; Roy M. Jacobs, Standard Brass Works; and B. D. Claffey, General Malleable Corp.

Wisconsin Chapter Plans Regional

The committee in charge of arrangements for the second annual regional foundry conference to be held at the Schroeder hotel, Milwaukee, Feb. 16 and 17 under the joint auspices of the Wisconsin chapter of the A.F.A. and the department of mining and metallurgy, University of Wisconsin, met Oct. 24 to plan the program. The conference will embrace two full days and one night meeting. With 300 registered last year, the quota for 1939 has been set at 500.

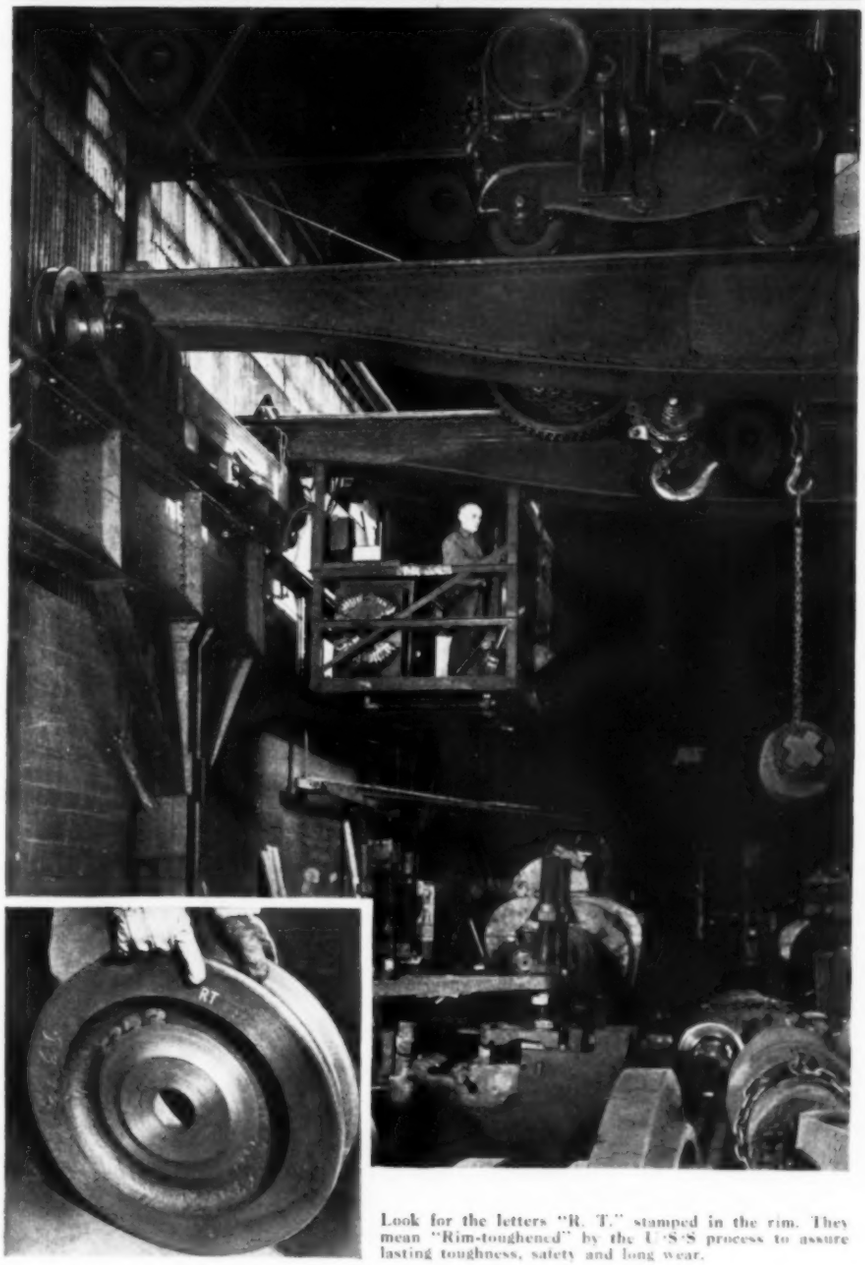
Members of the committee are as follows: Charles I. Wesley, Wesley Steel Treating Co., and Prof. E. R. Shorey, University of Wisconsin, co-chairmen; R. S. MacPherran, Allis-Chalmers Mfg. Co., Prof. J. F. Oesterle, University of Wisconsin, David Zuege, Sivyer Steel Casting Co., Edward Meyer, Chain Belt Co., William J. MacNeill, Federal Malleable Co., Stanley P. Waltermire, Chain Belt Co., Roy M. Jacobs, Standard Brass Works, and B. D. Claffey, General Malleable Corp.

Regional Conference At Rutgers

A regional foundry conference sponsored jointly by the Metropolitan Philadelphia chapter and the Metropolitan New York-New Jersey chapter of the American Foundrymen's association will be held at Rutgers university, New Brunswick, N. J., Saturday, April 1. The morning session will be devoted to a discussion of castings from the viewpoint of the consumer and the producer. The afternoon session will deal with casting defects as affected by sand and by gates and risers. A dinner meeting will be held Saturday evening.

W. B. Coleman, secretary of the Philadelphia chapter is general chairman of the committee and Prof. W. C. Schulte, department of mechanical engineering, Rutgers university will represent that institution on the committee. The Philadelphia chapter members are as follows: W. C. Hartman, John Howe Hall, and H. L. Henszey. New York-New Jersey chapter members are as follows: T. D. Parker, W. A. Phair, Sam Tour.

Take a TIP from the Railroads



Look for the letters "R. T." stamped in the rim. They mean "Rim-toughened" by the U·S·S process to assure lasting toughness, safety and long wear.

Equip your overhead "Rolling Stock" with U·S·S Wrought Steel Crane Wheels

THERE'S no escaping it—in crane wheels, as in railroad car and locomotive wheels, *mileage* and *safety* are the deciding factors. In high-duty railway service—on locomotives, tenders, and passenger cars, where the going is tough and maximum safety is required — U·S·S Wrought Steel Wheels are standard. To meet like demands for safety and service, builders of the world's finest cranes are using U·S·S Wrought Steel Crane Wheels.

Mileage—Fine crane manufacturers have found that U·S·S Wrought Steel Crane Wheels outlast ordinary wheels by approximately 2½ to 1.

Safety—Scientifically designed and manufactured with utmost precision, these high-quality wheels are strong enough to withstand the most strenuous crane service, with a liberal margin of safety to spare.

It's sound economy to specify U·S·S Wrought Steel Crane Wheels for your new equipment and for replacements. An exclusive rim-toughening process toughens their treads and flanges, making them wear exceptionally slowly and evenly. Correct finish machining, assuring proper bridge alignment, adds thousands of miles to their useful service life.

U·S·S Wrought Steel Crane Wheels, double flange or single flange, are furnished rough machined or finish machined with finish bore and keyway—rim-toughened or untreated, as desired. Write for complete data.

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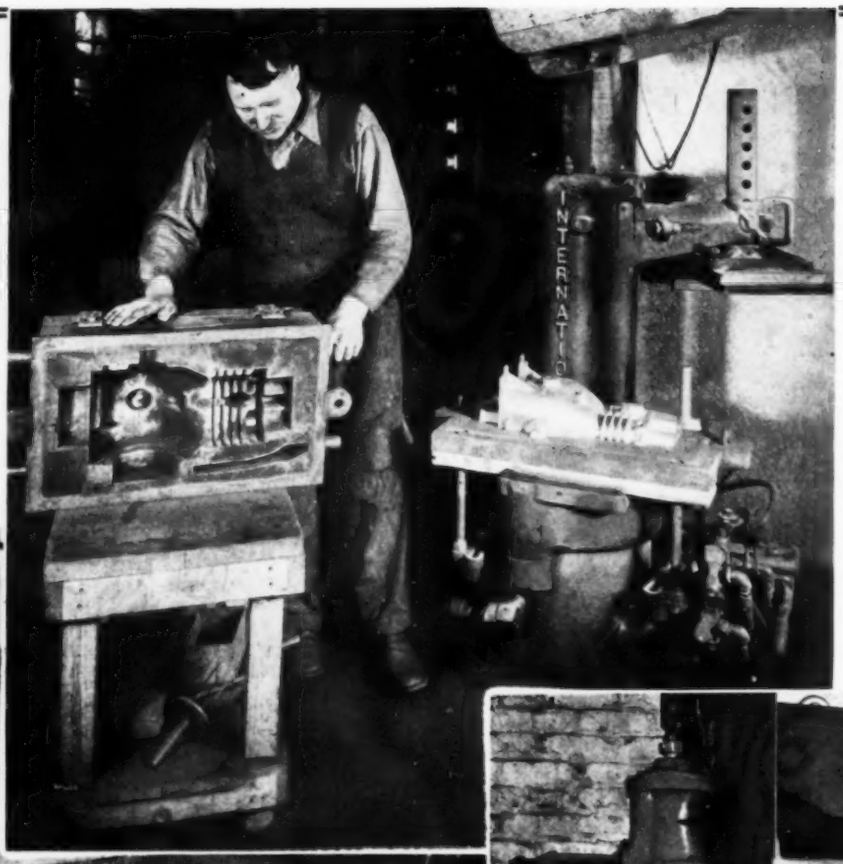
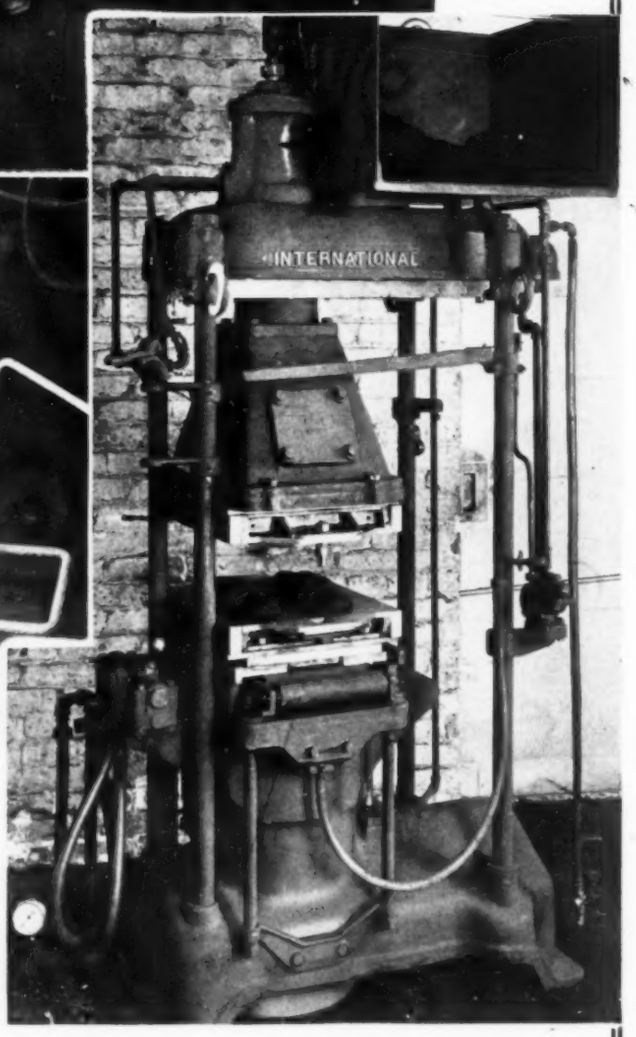


Type HJ Jolt Turnover Draw Machine



Type SB 11 Blower Making Green Sand Cores

Our 1939 calendar showing many interesting foundry views will soon be ready. To insure your receiving your copy, please send us your name and address.

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machines are made in

65 Standard Types for Castings
14 Standard Types for Cores

Many Special Types for Special Work

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Stresses Safety and Health At Open House

HAMILTON FOUNDRY & MACHINE CO., Hamilton, O., wound up the year's safety and hygiene educational program by holding open house Oct. 8, for employes, families and friends to the number of over 700. High lights of the day included refreshments, souvenir castings, customers' industrial exhibit incorporating the company's castings, protective safety and hygiene devices, illustrated lecture on tuberculosis by Dr. W. J. Smith, also addresses by city manager Russell B. Price and Charles G. Barth, Industrial Commission safety engineer.

On Monday, Oct. 10, 240 executives, purchasing agents, supervisors and engineers from the surrounding territory and from points as far away as Rockford, Ill., Detroit, and Waynesboro, Pa., had a similar program and were taken in small groups on a routed tour through the plant.

Permanent display of protective safety and health devices and appliances in the first aid room showed various types of goggles worn by men handling molten iron, cupola men and men in the cleaning room. Grim reminders included several pairs of goggles spattered with iron or nicked, cracked or broken, but tagged to indicate that in each case a serious eye injury had been prevented. Other items of safety included leggings, safety shoes, respirators, blast hoods, masks, cupola men's helmets and disinfectants for use in locker rooms and elsewhere. An oil dust layer and heavy duty portable vacuum cleaner keep down the dust. Safety ladders, safety shoes for ladders, safety car door openers, safety car movers and fire extinguishers added to the display. Examples of tools in a dangerous condition included hammers and chisels with mushroom heads and wrenches sprung out of shape. A cut away model safety shoe showed the construction and the worn shoe of an employe showed the protection afforded when a 1-ton sand cutter ran harmlessly over his right foot.

Men and management are proud of the Industrial Commission's certificate of safety merit awarded the company as group winner in the Hamilton industrial safety campaign Jan. 1 to June 30, 1938. The certificate is mounted prominently over the permanent protective safety and hygiene devices case.

In preparation for the open house, letters were sent out Sept. 29 inviting all employes and their families. An enclosure covered sections of Ohio laws relative to the safety of those employed in the foundry industry and stressing the obligation

Above—Products incorporating Hamilton castings. Below—Equipment and literature featuring safety practice. Bottom—Executive and managerial staff Hamilton Foundry

Display of patterns employed in the production of a wide range of simple and intricate castings for a far flung list of customers

of the workers to obey these laws. Oct. 8, from 9 a. m. to 4 p. m., the plant was thrown open for all employes, their families and friends. Peter E. Rentschler, president of the company addressed each group in the assembly room immediately before the regular educational movie program. His two younger sons Peter R. and Jim, 7 and 10 distributed lollipops to the children and in many cases to parents with a sweet tooth, as they entered the assembly room.

Dr. W. J. Smith, chief, bureau of tuberculosis, Ohio State department of health showed an educational movie on tuberculosis contacts and how contacts are made. Also another titled "Live and Let Live" was shown. In a running comment the speaker reviewed the story of tuberculosis as shown by the series of wall posters and charts. For amusement an animated cartoon depicting startling episodes in the life and adventures of Pop Eye the sailor man was shown by Bill Rentschler, oldest son of the president. The program was repeated four times, beginning at 9:00 a. m; 10:30 a. m.; 1:00 and 2:30 p. m.

At the conclusion of each program leaflets were distributed on "Tuberculosis—What You Should Know About It—Its Discovery, Prevention and Treatment" by the Ohio department of health; "The Tuberculin Test" "Contact from Whom To Whom" and "Who Next" by the National Tuberculosis association; and a booklet "Tuberculosis" by the Metropolitan Life Insurance Co. Each guest also was presented with a souvenir cast iron paper weight.

After the first movie, city manager R. P. Price addressed the group of 180 which filled the assembly room to capacity. He then went into the exhibit room where he was introduced by Mr. Rentschler and addressed a group of 300 viewing the exhibit. In an address by C. J. Barth, safety engineer, division of safety and hygiene, Industrial Commission of Ohio, particular attention was directed to the exhibit of protective safety and health devices and appliances used in the plant and the exhibit and literature of his department available for distribution. Visitors then were taken on a tour of the plant in groups of 20 with supervisors to explain features of interest.

Henry A. Rentschler, secretary and treasurer of the company since its organization in 1891 spent the greater part of the day greeting visitors and reminiscing with the older and past employes. Among the latter was the city of Hamilton fire chief, W. C. Conlin who served an apprenticeship with the company many years ago. Sisters Leonard, Benignus and Regina, x-ray technicians at Mercy hospital who x-rayed all employes last June were interested spectators at the late afternoon tuberculosis lecture.

In the evening the program was repeated for executives, supervisors, office employes of the company, and invited executives and supervisors of other plants in the city. The morning program was repeated with additional remarks by C. J. Barth, safety engineer, and Stanley Ogg, field investigator, division of safety and hygiene, industrial commission of Ohio.

The Hamilton Foundry & Machine Co., in June, 1938, inaugurated an intensive safety and hygiene educational program. The entire organization, supervisors, clerical help and executives were physically re-examined, blood tested and chest x-rayed. For over 10 years every applicant for work has been physically examined. Each employe has been re-examined at irregular intervals depending on the last findings in each case. With the changes in the occupational disease section of

(Concluded on page 70)

Left—Business office equipment in which small castings are employed extensively. Above—Devices and literature outside the first aid room impress the idea of safety first on the employes

THERE'S A SLY DUST FILTER FOR EVERY FOUNDRY NEED

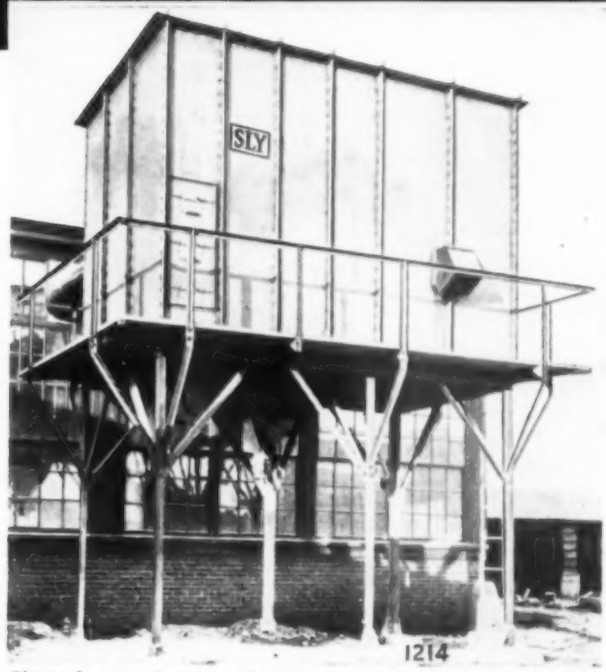
See.. SLY For Savings

★ In collecting foundry dust from various sources, e. g., during silica wash on cores, core rubbing, core cutting, molding operations, casting cleaning (blasting and tumbling) and grinding, a *large* Sly Dust Filter is recommended. To collect dust from only one or several of these sources a small, stationary or portable inexpensive Sly Unit Filter is available.

Regardless of size of the Sly Filter you buy, the filtering capacity is greater per sq. ft. of available floor space than any other filter on the market. Special flat cloth filter bags assure you of more efficient dust control. Made of high grade, long fibre cotton, woven to our special specifications, these bags possess greater strength and longer life. A simple shaking device cleans the bags by jarring, beating and flexing them over 400 times per minute. This action—similar to cleaning a dust cloth—effectively removes the collected dust, assuring complete dust collection at all times under the most severe conditions.

Simple in construction, sturdy and strong, the filters are especially designed to conserve space on the inside or outside of the plant.

Your investigation of a Sly Dust Filter will mean substantial savings for you. Write, today, for Bulletin F-90.



Shown here is a large Sly Type No. 350 flat bag filter engineered for large dust control installations. The steel case is air tight and weatherproof. The special bags are mounted in rows two or three tiers high. Each bag has 22 square feet of filtering area.

Much lower in price, this inexpensive Sly Unit Filter is constructed of the same sturdy material and fine craftsmanship prominent in all large Sly Dust Filters. Hand operated or motor driven shaker can be furnished.

THE W. W. SLY MANUFACTURING COMPANY

Blast Cleaning Equipment • Tumbling Mills • Dust Control Equipment for Every Industrial Purpose

4700 TRAIN AVENUE. CLEVELAND. OHIO • BRANCH OFFICES IN PRINCIPAL CITIES

(*Concluded from page* 68)

the workmen's compensation law in Ohio, effective July 31, 1937, and in view of studies of experience in other states, it was thought advisable to physically re-examine as a group all employes and in addition to make blood tests and chest x-rays.

Physical examinations were conducted at the plant, but the Wasserman test and the chest x-rays were made at the local Mercy hospital. Through co-operation of the local health commissioner the state department of health laboratory made the blood analyses. Beside the x-ray readings made by the roentgenologist of Mercy hospital in conjunction with the physical examination findings and the blood test reports, independent interpretation was made by a Chicago roentologist specializing in industrial work. Each employe was then interviewed by the company physical examiner and personnel director and told of the findings in his case. Any physical defects needing correction were called to his attention and recommendation made that he consult his family doctor.

As a business institution the present Hamilton Foundry & Machine Co., continues the traditions laid down by George Adam Rentschler, founder of the Rentschler foundry interests in Hamilton. The old Sohn & Rentschler Foundry partnership started in June, 1875 and continued until the great Miami flood in 1913 washed away everything but the pig iron in the yard. Before that time the business developed to such an extent that it was impossible to handle all the quality precision small castings. The Hamilton Foundry & Machine Co., was organized in September, 1891, to take care of this class of castings.

Over the past 20-year period the largest castings are four cycle, 6-cylinder diesel engine housings which weigh approximately 2700 pounds. In contrast to these, tiny castings 40 to the pound are made for the manufacture of office business devices. In 1937 the weight of the average casting was 3 pounds and the average pound traveled 204 miles to the customer.

Active executive officers of the company are Peter E. Rentschler, president and chairman of the board; Don McDaniel, vice president; H. A. Rentschler, secretary and treasurer. These officers with Frederick B. Rentschler, G. A. Rentschler and Walter A. Rentschler comprise the board of directors.

Study Sulphur and Its Compounds

A recently published bulletin entitled, "Contributions to the Data on Theoretical Metallurgy—VII, The Thermodynamic Properties of Sulphur and Its Inorganic Compounds," by K. K. Kelley, Bureau of Mines, now is available through the superintendent of documents, government printing office, Washington, for 15 cents.

Storage Has Over 45,000 Patterns

With standard and special patterns to the extent of over 45,000 pieces, valued at over a half million dollars, the Driver-Harris Co., Harrison, N. J., maintains one of the large pattern storages of the alloy casting industry. Inventory covers only patterns in active service. Obsolete and inactive patterns constantly are scrapped. An entire building is given over to pattern storage. Despite the wide range of sizes and shapes, a card index system locates any desired item.

Patterns are made in a well equipped pattern shop by a corps of patternmakers specially skilled in the peculiarities of heat and corrosion resistant metals. Some of the pieces, patterns for retorts, muffles, pots and normalizing shafts have been in use for several years yet retain their accuracy and fine finish.

Book Review

Principles of Powder Metallurgy, by W. D. Jones, cloth, 199 pages, published by Longmans, Green & Co., New York, and supplied by THE FOUNDRY, Cleveland, for $5, and in Europe by the Penton Publishing Co. Ltd., London.

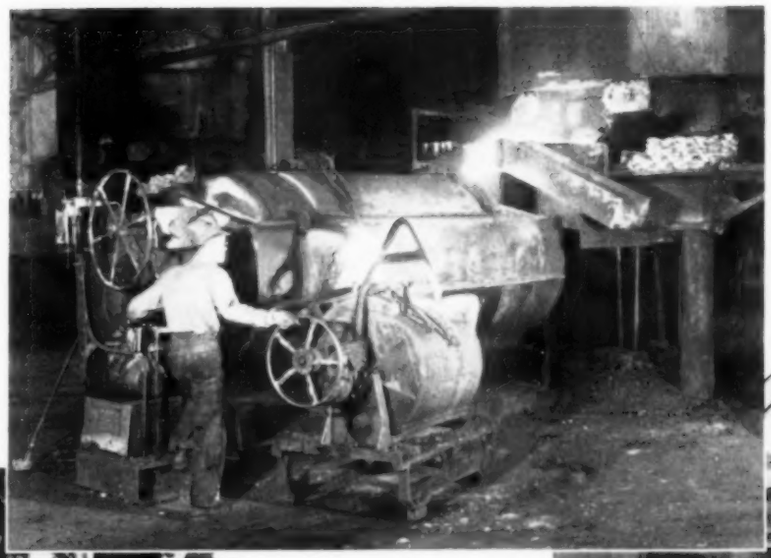
In preparing this first book in the English language on the subject of powder metallurgy the author has performed an excellent service. Information on the subject heretofore has been widely scattered, and much of that is in German and Russian. The book deals only with the use of metal powders for forming solid articles by pressure and heat, and in it the author has attempted to reconcile and explain conflicting facts and opinions relating to powder metallurgy.

The book is divided into six chapters of which the first discusses the principles of sintering massive metals. Chapter II describes the principles of sintering cominuted metals, and points out the effect of particle size and shape, applied pressure, temperature, gases and vapors, sintering forces, etc. Physical properties of sintered metal compacts, and influence of method of preparation are dealt with in Chapter III where such phases as nature of sintered boundary, general characteristics, extra sintering phenomena, grain growth, etc. are discussed.

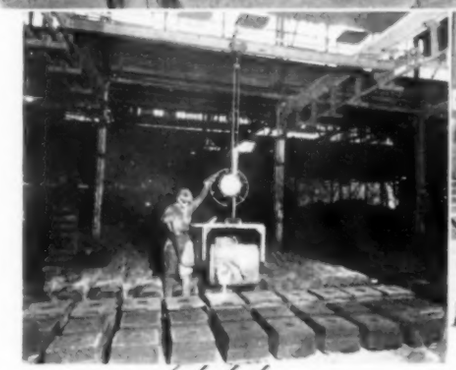
Chapter IV describes industrial applications of various powders including platinum, iron, nickel, nickel-iron, bronzes, chromium, tungsten, etc. Chapter V is concerned with manufacturing hard metal alloys by sintering including the application of hot or cold pressing. The sixth and final chapter describes the manufacture, properties, and testing of metal powders.

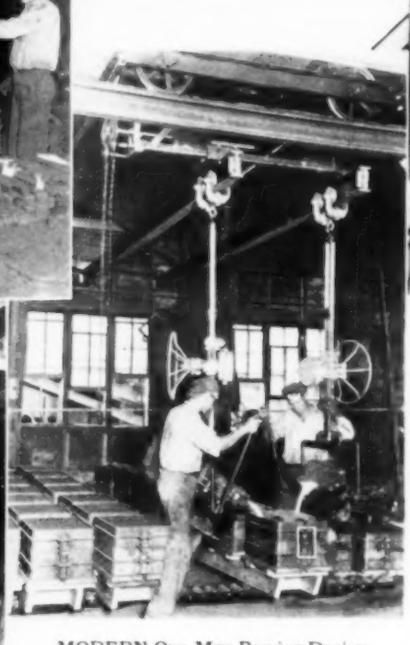
APPLY *Modern* EQUIPMENT *in your foundry!*

MODERN Enclosed Elongated Mixing Ladles produce uniformity of metal and permit metal refining in the ladle. Metal temperatures maintained three times as long as in open mixing ladles.

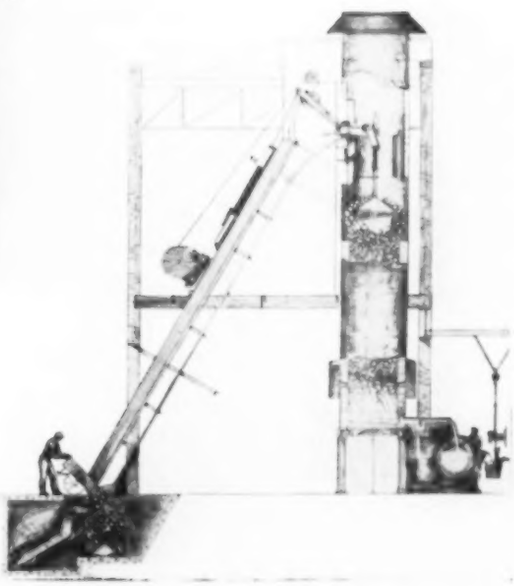


Mfgd. under USA Patents 1703231, 1816185, 2073150, 2079765, 2122032, 2100713, 2134785, others applied for





MODERN One Man Pouring Devices



MODERN Covered and Insulated Ladles enable handling larger amounts of metal with less heat loss.

The MODERN RICHARDSON Cupola Charger reduces charging and melting costs to a minimum.

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MODERN EQUIPMENT CO.

Low Carbon Iron

(*Concluded from page 27*)

higher freezing point and the decreased fluidity complicate the gating problem.

Pop gates work well on many jobs. They should be made larger as the carbon content decreases. With these gates the conditions are the reverse of those obtained with draw gates. The hot metal is on top instead of at the bottom. They are especially well suited for jobs cast on end and finished on the inside, on the outside, or both, cylinder liners, hydraulic cylinders and rams, valve liners, and certain other jobs similar in design and requirements.

In gating plates for snap flasks and other jobs where several castings are poured simultaneously it is well to try to get iron of the same temperature in all of the castings. Gating one casting off another does not work well, because the first casting acts as a cleaner for the next; besides, it also gets hotter metal. The hottest metal generally is in the castings nearest the pouring sprue. Fewer patterns in a flask and more room for the gate sometimes results in a larger percentage of commercial castings.

Pour Metal Hot

When gating castings of light and heavy sections it is well if possible to gate on the lighter section. The idea is to put the hot metal in the light section and the colder metal in the heavy section. This is a move in the direction of uniform cooling in sections of varying size. It is also well to pour low carbon irons faster than the higher carbon irons. It is also agreed that the melting temperature should be as high as possible.

However, it is possible, that we may have to make some change in our opinions regarding melting temperature. It appears that some of the makers of important light castings, such as piston rings and very light cylinders, recently have discovered ferrite segregations on and under the finished surfaces. The ferrite particles are visible to the naked eye. When formed in clusters soft spots develop. In the opinion of those who have done most of the research work along this line the condition is caused by high melting temperatures. Few foundrymen or metallurgists have seen any evidence of this condition. Undoubtedly research workers will make a study of the materials and melting units used. At the moment cupola melters probably need not be concerned unduly as long as they stick to good melting practice and proper materials.

Pouring temperatures are being studied and some shops have arrived at what they consider the proper temperature for special jobs. There should be every reason to consider this factor, as it is quite important in other fields, casting and rolling of steel, brass, and other nonferrous alloys. The same iron poured at high, medium, and low temperature into test bars of the same size will show variations in the strength. If the strength varies, so do also the other physical properties. The pouring temperature is governed by thickness of section, design, carbon content, and the alloys and constituents present. As more experience is gained the results are bound to improve.

Keep a Log on All Jobs

Some foundries keep a log on all jobs involving special irons, and the pouring temperature is one of the important items in the record. One of these foundries recently delivered eight sets of turbine casings to a shipyard which received very favorable comment on account of their uniform density through all sections, good machinability, and exceptional strength. These irons were cupola melted. This is interesting because this type of casting is subjected to very rigid inspection and the final inspection frequently is a sad experience for all concerned.

Cooling the metal for heavy section work complicates foundry operations. There is still much to be learned about this subject. Placement of risers also is a problem. On some jobs it is necessary to provide sink heads while other jobs are better without them, even though the grade of iron is the same in both instances. A large number of gears are made without feeding risers, except for the small risers used for letting out air and gases and for showing when the mold is filled. Hydraulic rams of any size, carry sink heads the full diameter of the top, as cast, and 30 inches or more in height. A sink head is ideal when conditions are favorable.

In one foundry the riser problem is considered so important that photographs are made of good and bad practices. These photographs are used for reference and as a guide on new jobs. They also provide a convincing record evidence of the progress made. This may seem to be going to the extreme. However, they are getting results and that is what counts.

One subject of considerable concern to foundrymen is top risers versus side risers. This problem is answered only by actual experience with specific jobs. Large flywheels, for instance, are made in halves in the same mold, and poured at the same time. These castings are poured on the hub and the iron flows out the arms to the rim. The hot metal therefore is in front of the arms and in the hub, with the colder metal between the arms. The risers, if placed in front of the arms, have a different job to perform than those placed between the arms, due to the difference in temperature and other conditions. If feeding is attempted the risers are placed at the intersection between arm and rim, and on the hub. These wheels have been made with side risers on one half and top risers on the other half, and placed in exactly the same position in each case. Even under these similar and favorable conditions the results obtained for the two halves may not be identical. On the average side risers seem to produce the best results.

Size, location, and method of feeding risers are all important. Risers of sufficient size often are necked down to the extent where they are absolutely worthless as far as feeding is concerned.

The lower the carbon content, the less effective is churning, because the rod tends to freeze the metal in the riser, thus preventing the riser from functioning as intended. Filling the risers with hot metal directly from the cupola, instead of from the pouring ladle, works well in some cases.

Copy from Steel Practice

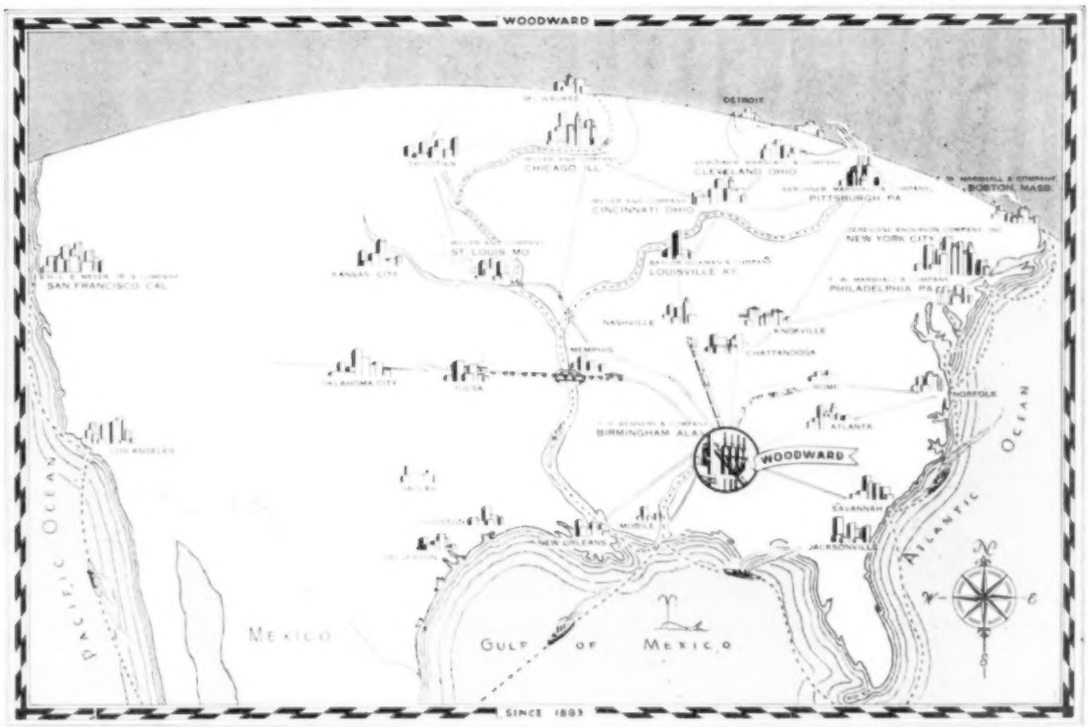
Risers are not used as extensively for gray iron as for steel. At the same time foundrymen making low carbon gray irons can learn considerable from methods employed in the steel shops. Blind risers may be a help if properly handled. These risers are not exposed to the air. The heat going in cannot escape. The sand consequently becomes so hot that it tends to keep the metal in the risers fluid, thus prolonging the feeding period.

Some jobs are benefited by pouring the metal slowly as the iron enters the risers. This brings the risers up slowly. The idea is to take as much strain off the mold as possible and still have the benefits from the height of the heads. A job in green sand will benefit more from this procedure than one in dry sand. A mold which strains tends to aggravate the condition to be overcome.

In looking over a job to determine the proper way of molding, note should be made of finished surfaces. If possible these should be favored by putting them in the nowel, or drag. The next question is: Which is the fastest and cheapest way? Then: What rigging is available? Very often the foundryman is content with the answer to these questions.

Strategically Situated To Give You

PROMPT SERVICE on GOOD PIG IRON



THIS map has been prepared to visualize for Woodward customers, especially those outside the South, the centrally located position of the Woodward properties for easy movement of pig iron to different sections of the country by rail, rail and water or an all water route.

Woodward's properties are just twelve miles from Birmingham, the most centrally located city in the South and nearer to all larger centers in the North and East than any other city in the deep South.

This central location, combined with Woodward's modern plant facilities, assure Woodward customers prompt service on iron of uniform consistency under all conditions of the pig iron market.

Your inquiries are invited.

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You know THE FOUNDRY . . . so you know what new production and jobbing methods have been tried successfully in other plants around the country.

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THE FOUNDRY
CIRCULATION DEPARTMENT
PENTON BUILDING, CLEVELAND

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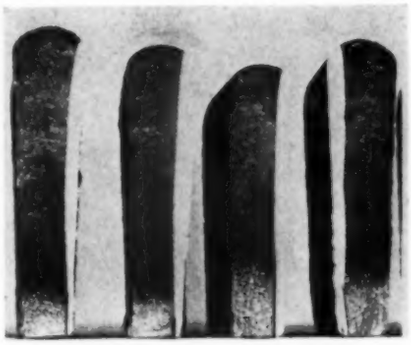


Fig. 10—Relative chilling tendencies of heats No. 1265, 1266, 1267 and 1268 from left to right respectively

High Strength Irons

(*Continued from page* 30)

The higher strengths are obtained because there are fewer graphite flakes to break up the continuity of the matrix. However, the lower total carbon irons must not contain massive carbides or free ferrite to obtain the highest strength-hardness ratio. To prevent the formation of those two constituents, the silicon must be adjusted to a content which is beyond the range usually employed in high test irons.

By increasing the fluidity the higher silicon contents reduce the tendency toward miss-runs and round edges of thin sections, and blow holes caused by gas bubbles which have no time to escape before the iron solidifies. The tendency to chill near the skin which results in poor machinability is also eliminated. Besides being a graphitizer, silicon also strengthens the matrix by forming a solid solution with iron. This fact is demonstrated in Table IV.

B. Late Additions of Silicon—The specific effects of late additions of silicon to cast iron was discussed in considerable detail by Crosby and Herzig in THE FOUNDRY, January, 1938, page 28. As will be recalled, the previous study disclosed that if the base iron was produced by melting a large percentage of steel scrap in the cupola, the proper proportion of silicon should be added as a late addition (instead of incorporating *all* the silicon either with the charge or adding it entirely as a late addition) to produce iron with superior properties.

Among the subjects discussed in this paper was the effect of late additions of silicon in producing a uniform distribution of graphite flakes where irons are inclined to solidify with the graphite precipitated in fine flakes arranged in a decidedly dendritic pattern, which is oftentimes associated with a ferritic area surrounding the graphite flakes. Such graphite distribution results in low strength irons characterized by poor ductility and inferior wear resisting properties. To ensure a uniform distribution of graphite flakes in the following irons discussed late additions of silicon were employed as indicated.

Two theories have been advanced which may explain this phenomenon:

1—Late additions of silicon may serve to create graphite nuclei in the melt promoting the formation of numerous centers from which flakes may grow, producing a uniform distribution of small flakes.

2—Late additions of silicon undoubtedly have a deoxidizing effect on cast iron. Pure molten iron dissolves little oxygen at temperatures up to 2700 degrees Fahr., but between 2750 and 3100 degrees Fahr. the solubility increases rather rapidly. At about 2780 degrees Fahr. iron will dissolve 0.21 per cent oxygen and at 3080 degrees Fahr. it will dissolve 0.45 per cent oxygen, according to Herty, Gaines, Larsen, Simkins, Geruso and Watkins, *Cooperative Bulletin* 34, Carnegie Institute of Technology.

While it is recognized that the presence of carbon, silicon and manganese will affect the solution of oxygen in molten iron, those figures indicate a trend toward higher oxygen absorption by cast iron as the superheating temperature increases.

Foundry observations have indicated that molten cast iron containing a high oxygen content as a result of over heating is prone to undercool upon solidification. This undercooling results in the precipitation of graphite in the familiar dendritic pattern. The fact that proper late additions of silicon will eliminate this dendritic pattern may be taken as an indication that deoxidation takes place.

C. Use of Alloys—Advantages of nickel additions to cast iron to improve machinability and enhance the physical properties are well established and require no detailed comment.

Molybdenum usually is added to gray iron to produce a harder and stronger product. The specific influence of this element on the shape, size and distribution of graphite flakes, as well as its ability to increase the strength of the matrix (both by solution in the ferrite and by its power to reduce the rate of transformation from austenite) is demonstrated in the accompanying series of experimental irons. In the present laboratory heats, molybdenum alone has been added to the base iron as well as molybdenum in combination with nickel. In one heat, molybdenum and copper have been used as alloying elements.

Heats No. 1228 to 1231 comprising group *A*, were prepared for the purpose of studying effects of chromium and vanadium on nickel-molybdenum high strength irons, and the effect produced by raising the carbon, manganese and molybdenum approximately 0.50 per cent each and omitting the nickel (heat No. 1231). These heats were *synthetic*, being produced in a high frequency induction furnace from an ingot iron charge, graphite granules and ferroalloys. Each heat was melted down with iron, graphite and 1.00 per cent silicon as ferrosilicon. The melt was heated to 2800 degrees

TABLE III

Data on Heats Forming Group C

Heat No.	1299	1300	1301	1302	1303	1304	1305
Chemical Analysis							
Total Carbon	2.50	2.48	2.48	2.49	2.45	2.49	2.46
Combined Carbon	0.60	0.66	0.67	0.66	0.60	0.75	0.64
Graphitic Carbon	1.90	1.82	1.81	1.83	1.85	1.74	1.82
Manganese	0.98	1.01	1.49	2.07	1.04	1.02	1.06
Silicon	2.82	2.82	2.69	2.74	2.74	2.68	2.59
Molybdenum	.....	1.00	1.06	1.06	1.44	2.03	1.01
Nickel	.....	1.09	.....	.....	.....	.....	.....
Copper	.....	.....	.....	.....	.....	.....	1.06
Superheating Temp., degrees Fahr.	2700	2700	2700	2700	2700	2700	2700
Pouring Temp., degrees Fahr.	2650	2650	2650	2650	2650	2650	2650
Physical Properties							
1.2-inch Section							
Brinell Hardness	285	341	363	429	341	341	352
Transverse Test							
Load in pounds	3,806	4,545	5,080	3,540	3,770	3,900	4,025
Deflection in inches	0.280	0.407	0.445	0.283	0.267	0.254	0.320
Tensile Strength p.s.i.	69,800	81,750	82,350	.....	71,100	74,950	81,500
2-inch Section							
Brinell Hardness	255	311	331	363	321	341	302
Transverse Test							
Load in pounds	13,790	16,900	14,175	17,640	15,180	15,550	16,200
Deflection in inches	0.333	0.503	0.326	0.440	0.320	0.313	0.392
Tensile Strength, p.s.i.	54,680	74 150	65,600	64,720	64,350	72,200	67,400
Impact Strength, ft. lbs.	44.4	105.5	108.3	80.3	89.7	87.0	120+

(See Fig. 2 for relative chilling tendencies of these irons).

Fahr., at which time ferromolybdenum, nickel and the remaining ferrosilicon were added. (This was 15 minutes prior to pouring). Ten minutes later the ferromanganese was added. When vanadium was included in the composition, it was added 2 minutes before pouring. All heats were poured at 2650 degrees Fahr.

Heats No. 1265 to 1268 comprising group *B*, were prepared in the same manner. These heats were produced from ingot iron croppings which analyze approximately 99.8 per cent iron. Carbon, manganese, silicon and alloys were added to those croppings to produce the desired analysis. The ingot iron, all carbon and 1.00 per cent silicon were charged into the 30-pound induction furnace. The charge was

Table IV

Silicon Effect

Component	Silicon Per cent	Tensile Strength Pounds per Square Inch
Ferrite	0.001	36,100
Silico-ferrite ..	0.82	45,150
Silico-ferrite ..	2.28	63,500
Silico-ferrite ..	3.4	77,400

According to Yensen in "Magnetic and Other Properties of Iron-Silicon Alloys Melted in Vacuo," University of Illinois Experimental Station Bulletin No. 83 (1915)—(*Alloys of Iron and Silicon*, by Greiner, Marsh and Stoughton, page 82).

then melted down and alloys, added to the melt. The remainder of the silicon was added 6 minutes before pouring, at which time manganese also was added. The superheat temperature for these irons was reduced to 2700 degrees Fahr., the pouring temperature being held to 2650 degrees Fahr. as before.

Heats No. 1299 to 1305 comprising group *C*, were melted down in accordance with the program used for Heats No. 1265 to 1268.

Three castings were made from each heat: One chill block, one A.S.T.M. 1.2-inch standard arbitration bar 21 inches long, and one 2-inch arbitration bar 27 inches long. All molds were baked sand molds. In transverse tests the 1.2-inch arbitration bars were broken on 18-inch centers, and the 2-inch arbitration bars were broken on 24-inch centers. Standard cast iron tensile bars of 0.800-inch diameter were machined from the broken sections of the transverse bars and pulled in a hydraulic tensile machine. Impact test bars were machined from the broken sections of the transverse bars.

The impact test bars were of the Charpy type (simple beam) unnotched, 1.125 inches diameter and 8 inches long. They were broken on 6-inch centers in an impact machine with an initial energy of pendulum, 120 feet pounds; weight of pendulum, 23.57 pounds; distance of center of rotation to center of percussion, 2.625 feet; velocity of hammer at instant of striking specimen, 18.1 feet per second.

Adventures of Bill

(*Concluded from page* 52)

ond story window to collect a crowd. Then he threw a coat, or vest or pair of pants. The lucky catcher was entitled to the remainder of the suit for a ridculously low price.

"Gradually he branched into real estate, street car lines and banking. In the real estate business he prided himself on closing at least one big deal each day before dinner. His horsecars were painted bright blue, flaming scarlet and canary yellow. They all made money. About 1890 he bought the Tower block from Michael Jeffers at the peak of the angle formed by Genessee and Jefferson streets. He immediately placed a big clock on top of this building, surmounted by a heroic size statue of himself about 7 feet high. All his life he had been forced to look up to people. Now every person had to look up to him! Curious ambition, eh what?

"The most peculiar feature is that neither the body nor the face resemble Seligman's. The magnificent figure is shown draped in a flowing overcoat and cape similar to those worn by high ranking officers in the civil war. Doubting Thomases hold to the view that Jakie picked it up some place, probably at an auction sale, or at some second hand shop or junk yard. Makers of statues through one reason or another sometimes have the product left on their hands. I saw a bronze Robert Emmett in one corner of a statuary foundry yard in Philadelphia. The proprietor told me the history—"

"Some other time," I said. "Finish Jake before you start on Robert. That is—which I am beginning to doubt—if there is any finish to the story."

"Whether the local inhabitants believed the story or not, little Jake kidded himself into the belief that the statue was a true replica of himself. To carry out the illusion he had a little overcoat made with a long flowing cape similar to the coat on the bronze figure. Thereafter, he wore the coat on all possible and on some impossible occasions.

"In 1892 he wrapped the overcoat around his pixie form and flew away to Detroit where the streets were longer and wider. With Edward Doyle and other associates he built the state's largest skyscraper, up to that time, the Majestic Building, still standing at the northwest corner of Michigan and Woodward avenues. Later on account of impaired health he moved to Salida, Colorado, where he was interested in light and power investments, banking, mining and other activities."

"Did he take the statue with him?"

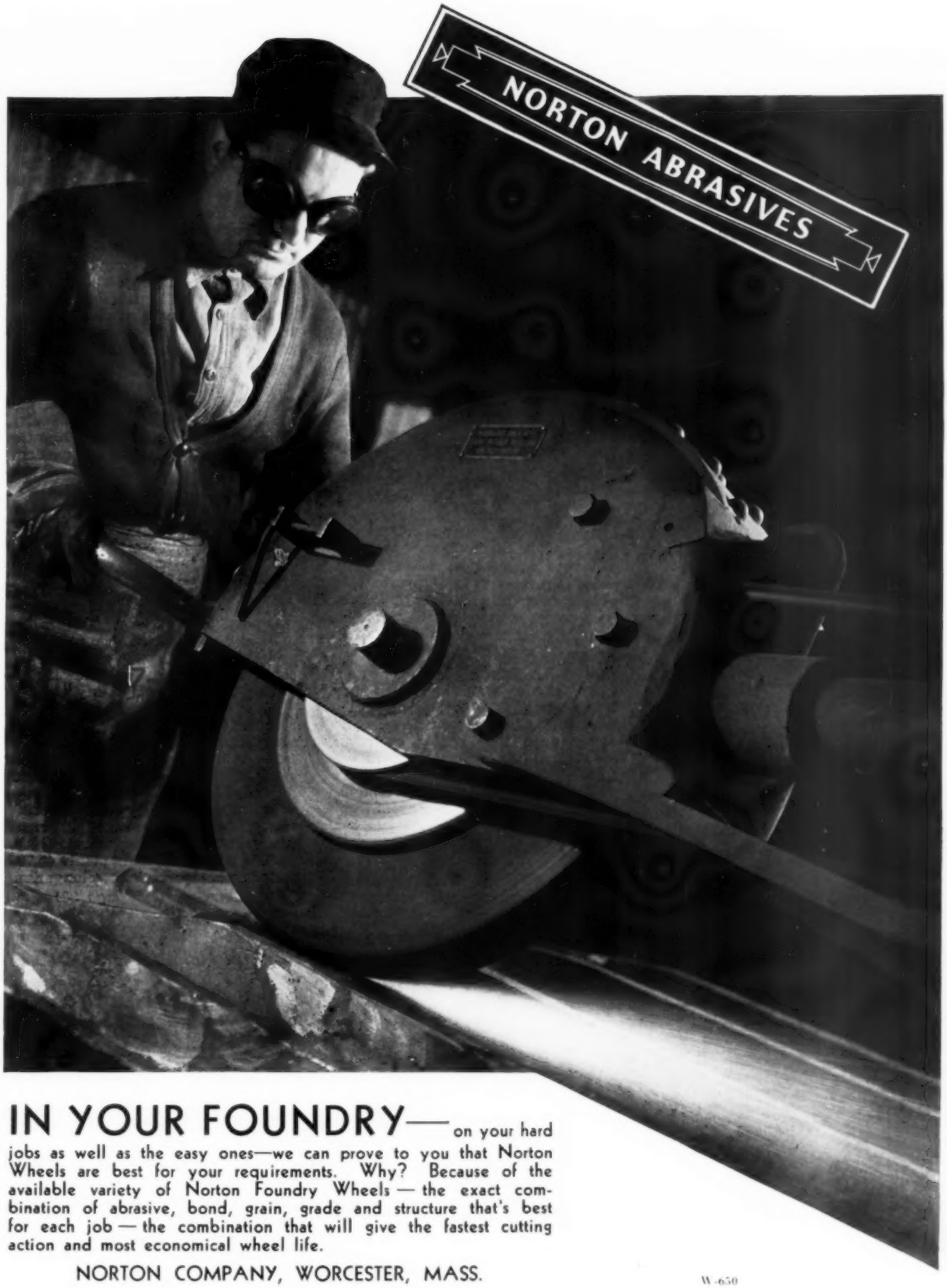
"He persuaded the city council of Saginaw that a clock was a civic necessity and then sold them the clock and statue for $600.00. That was in 1898 with war talk in the air. Perhaps the city fathers figured they could find some use for it after the war. It is still on top of the Tower building and I don't suppose a dozen people in Saginaw know who it is, what it is or how it got up there. The remainder of the population does not care."

"Amen," I said. "And neither do I."

British Institute Holds Meeting

Following the cancellation of the joint autumn meeting of the Iron and Steel Institute and the Institute of Metals (Great Britain) that was to have been held in New York on Oct. 3 and 4, the autumn meeting of the Institute of Metals took place in London on Thursday, Oct. 27, at the Institution of Mechanical Engineers, and the following papers were presented for discussion. Prof. C. H. Desch, National Physical Laboratory, Teddington, and president of the institute, acted as chairman.

"The Constitution of the Magnesium-Rich Alloys in the Systems Aluminium - Magnesium, Gallium-Magnesium, Indium - Magnesium, and Thallium-Magnesium," by W. Hume-Rothery and G. V. Raynor; "Factors Affecting the Liquidus, Solidus, and Solid-Solubility Curves in Some Alloys of Magnesium," by W. Hume-Rothery and G. V. Raynor; "Copper-Rich Nickel-Aluminium-Copper Alloys: Part II—Constitution of the Copper-Nickel-Rich Alloys," by W. O. Alexander; "Constitution of Aluminium-Zinc Alloys of High Purity: Nature of the Thermal Change at 443° C.," by Marie L. V. Gayler and E. G. Sutherland; "Oxidation-Resistance in Copper Alloys," by L. E. Price and G. J. Thomas; "Tarnishing of Silver and Silver Alloys, and Its Prevention," by L. E. Price and G. J. Thomas; "Some Characteristics of Copper-Aluminium Alloys Made from Aluminium of Very High Purity," by Marie L. V. Gayler; "A Study of the Mechanical Properties of Tin-Rich Antimony-Tin Alloys," by D. Hanson and W. T. Pell-Walpole.



IN YOUR FOUNDRY— on your hard jobs as well as the easy ones—we can prove to you that Norton Wheels are best for your requirements. Why? Because of the available variety of Norton Foundry Wheels — the exact combination of abrasive, bond, grain, grade and structure that's best for each job — the combination that will give the fastest cutting action and most economical wheel life.

NORTON COMPANY, WORCESTER, MASS.

W-650

Fig. 5—Sandslinger ramming unit with rollover draw machine for gray iron tight-flask work

Addition Increases Capacity

(*Continued from page* 33)

cent plant enlargement, a new sand handling system was installed. This central unit serves bench and floor molders on both the main and mezzanine floors. Wide distribution of the sand and space limitation introduced several complications to the layout of the system. Operation is controlled from a single panel containing push buttons which actuate the various moving parts.

The screen receiving sand from the shakeout is equipped with a gate which permits the sand to be discharged into either the floor sand hopper or bench sand hopper. The former has a capacity of 150 tons and the latter holds 75 tons. Sand is prepared in two mixers located at the ground floor level and made by the National Engineering Co., Chicago.

Mixers are equipped with dust exhausters. In the beginning it was found that such a large percentage of fines was removed from the bench sand that to retain desired molding properties, it was necessary to moderate the exhaust.

Sand moves to the bench molders on the mezzanine floor by an overhead belt conveyor. An operator moving along an adjoining catwalk diverts the sand to the individual hoppers. If for any reason it is necessary to stop the conveyor quickly, cutout switches are available a short distance apart.

A 75-ton hopper holds prepared sand for use on the ground floor. From this hopper sand is moved by conveyor either to a sandslinger or, by reversing the direction of travel, to buckets for distribution to the molding floor. Operation of the conveyor and sandslinger start simultaneously by a single control.

Steel and the larger iron castings are poured on the ground floor. Gas fired ovens are available for core and mold drying. Many of the smaller molds are dried by torch.

A central sand storage and preparation unit with shakeout serves the steel molding floor. This unit includes a mechanical shakeout made by the Vitus Mfg. Co., Chicago, magnetic separator belt, elevator heap and new sand overhead storage bins delivering through gates to a 6-foot mixer made by the Clearfield Machine Co., Clearfield, Pa. All units are connected to a dust collector installed by the American Air Filter Co., Louisville, Ky. This mixer discharges prepared sand into boxes for delivery by overhead crane to the molding floors. Tangible savings in new sand consumption, increased speed in ramming molds, and improved finish and quality of castings, are credited to this sand reclaiming and preparing unit.

Melting equipment includes three cupolas and two steel converters. Two cupolas are of 6-tons and one of 12 to 15-ton per hour capacity. Converters are 2-ton size. While the average weight of steel castings made is 40 to 45 pounds, larger sizes ranging up to 8000 pounds also are produced. For the maximum size castings several heats are held before pouring. Each blow requires about 14 minutes.

The two converters are operated from a glass enclosed control station located between them. From this point the operator regulates the blow and the eventual pouring. Manganese and carbon are added in the converter, while desulphurizing is accomplished in the ladle.

Metal charge for the converter represents from 80 to 85 per cent scrap. Consistently low sulphur content—average 0.03 per cent—is achieved in finished casting. Typical analysis of steel sprocket castings shows: Carbon, 0.30 to 0.35 per cent; manganese, 0.80 to 1.00 per cent; tensile strength per square inch, 84,300 pounds; yield point 45,700 pounds per square inch; elongation,

(*Concluded on page* 80)

Fig. 6—General view of gray iron sand preparation unit, 140-ton and 75-ton main sand bins with gate feed to 8-foot and 6-foot sand mullers. Prepared sand bin is at right. Fig. 7—Prepared sand bin, 60-ton capacity, with 30-inch reversible, no-leak, apron feeder; 20-inch inclined belt conveyor to sandslinger, and 16 x 8-inch continuous-bucket, shakeout sand elevator in foreground

This

ROTO-CLONE

installation at the

Otis Elevator Foundry

collects dust from four different operations

At the

1. **SHAKEOUT**
2. **ELEVATOR TRANSFER POINTS**
3. **SAND SCREEN**
4. **MAGNETIC PULLEY**

The Type W Roto-Clone installation at Otis Elevator is typical of scores of others now solving foundry dust problems throughout the country. This Roto-Clone exhausts 5,200 c. f. m. from the shakeout; 2,700 c. f. m. from the sand screen; 1,200 c. f. m. from the magnetic pulley; 1,200 c. f. m. from the sand screen discharge at the transfer points; and 700 c. f. m. from the elevator head—totaling 11,000 cubic feet of air per minute.

Complete information on the Type W Roto-Clone, which combines a water spray with dynamic precipitation, will be sent on request. Ask for Bulletin No. 274.

AMERICAN AIR FILTER CO., INC.
116 Central Ave. Incorporated Louisville, Ky.

TYPE W **ROTO-CLONE**
WATER SPRAY DYNAMIC PRECIPITATOR

(*Concluded from page* 78)

25.1 per cent; reduction in area, 50.0 per cent. Straight annealed castings with 0.42 per cent carbon and 1.10 per cent manganese show a tensile strength of 100,000 pounds per square inch, yield point of 51,900 pounds per square inch, 22 per cent elongation and 39 per cent reduction in area.

Sample analysis of high-test iron castings made from 75 per cent scrap charge shows: Total carbon 2.85 per cent; combined carbon, 0.50 per cent; silicon 2.09 per cent; manganese 0.82 per cent; phosphorus 0.032 per cent; sulphur, 0.071 per cent; nickel 0.35 per cent; tensile strength 44,900 pounds per square inch; brinell hardness 235.

Typical of a standard chilled iron casting with ⅜-inch chill is the following analysis: Total carbon 3.50 per cent; silicon 1.20 per cent; phosphorus 0.143 per cent; ultimate strength 30,500 pounds per square inch. Gray iron castings of 3.50 per cent total carbon, 0.56 per cent, combined carbon, 2.50 per cent silicon, 0.46 per cent manganese, 0.43 per cent phosphorus and 0.091 per cent sulphur show tensile strength of 24,000 pounds per square inch and 212 brinell hardness.

Thermodynamics

Bureau of Mines, Washington, recently has published another bulletin of its series on "Contributions to the Data on Theoretical Metallurgy." It deals with the thermodynamic properties of metal carbides and nitrides. Copies of the bulletin which is No. 407 may be obtained from the superintendent of documents, Washington, for 10 cents.

Provides Adequate Foundry Records

(*Concluded from page* 24)

melts, the taking of pouring temperatures might all well be duties of the foundry record clerk or be done under his immediate supervision.

In short, a good foundry record clerk is the foundry production manager and assistant foundry foreman or superintendent. If he studies his records well and visualizes the jobs as they are carried through production from time to time, he gradually will accumulate a fund of foundry knowledge which will be applicable directly to new jobs as they are received for production. If he combines the above with a bit of study and reading of the literature, he will make himself even more valuable and incidentally the foundry may show a real profit.

Book Review

Kent's Mechanical Engineer's Handbook—Design and Shop Practice, fabrikoid, 1400 pages, 5 x 8 inches, published by John Wiley & Sons Inc., New York, and supplied by THE FOUNDRY, Cleveland, for $5, and in Europe by the Penton Publishing Co. Ltd., 416-17 Caxton House, Westminster, London, England.

This eleventh edition of a well known work first appearing in 1895, practically has been rewritten in keeping with the changes in the mechanical world. The present edition has been prepared under the supervision of Robert T. Kent as editor in chief with the collaboration of a staff of specialists.

Encyclopedic scope of the work may be gathered from headings of the 28 sections under which the enormous mass of material is presented: General Properties of Materials; Iron and Steel; Corrosion and Corrosion Resistant Materials; Nonferrous Metals and Alloys; Nonmetallic Materials; Fabricated Materials; Strength of Materials; Mechanisms and Mechanics; Fastenings; Mechanical Springs; Rotating Members; Keys, Cotters, Pins, Tapers and Fits; Bearings and Lubricants; Gearing; Control Mechanisms; Vibration and Noise; Structures and Buildings; Industrial Heating Processes; Forging Practice; Foundry Practice; Machine Shop; Woodworking; Materials Handling; Mechanical Power Transmission; Electric Motors and Their Control; Miscellaneous Shop Equipment; Safety Engineering; Mathematical Tables.

Of particular interest to those connected with the foundry field is the section devoted to foundry practice, malleable castings and nonferrous foundry practice. It contains 52 pages on various phases of foundry practice which are presented in a highly condensed form, and depict the latest available information at the time of publication. Each section of the book carries its own sequence of page numbers, and the book is provided with an exceptionally complete index of 78 pages.

Thomas Prosser & Son, 120 Wall street, New York, have been appointed distributors in the United States for the worm reducer developed by David Brown & Sons, Huddersfie'd, England.

Decorates Veranda and Yard with Cast Iron

THE attractive veranda supports and the garden furniture shown in the accompanying illustrations present an interesting link with the seventies and eighties of the past century, reflect the good taste of the present owner and offer proof, if proof is needed, of the enduring properties of cast iron. The light, airy and graceful veranda supports set off the front of the house in a manner that cannot be duplicated by any other material. The cast iron chairs, settee, sun dial in the right foreground and large flower urn in the right background harmonize perfectly with the lawn and shrubbery. Photographs by G. H. Manlove. Home of Dr. Larkin, Hillsboro, O.

☆

How to Keep Sopranos away from German Bands

☆

What a mess radio would be if broadcasting stations couldn't keep strictly to their assigned frequencies!

Coloratura sopranos would get mixed up with German bands. Vox Pop would rudely interrupt the New York Philharmonic. And our famous comedians might suddenly find themselves ribbing the wrong sponsors. Commercial broadcasting would be impossible under such conditions.

Fortunately, this problem was solved before it really became a problem. Long ago radio engineers found that the length of the waves emitted by a broadcasting station could be accurately controlled by the use of a specially selected and prepared natural quartz crystal.

If the control is to be rigid, the thickness of the crystal must be absolutely accurate and the faces between which the thickness is measured strictly parallel. With the aid of abrasive materials such as made by The Carborundum Company, quartz crystals are now produced with optically flat and parallel faces, with thickness so accurate that they must be measured by the wave length of light! From the very beginning Carborundum research has been instrumental in developing right abrasives and methods to do this exacting job.

Thus, thanks to modern abrasives and grinding practice, broadcasts are easily held to their assigned frequencies. Radio, instead of being in utter confusion, is one of the pleasures of the nation.

AN INVITATION TO EXECUTIVES CONCERNED WITH MANUFACTURING

Whatever you make, there are two ways in which The Carborundum Company's Abrasive Service can help your company. Highly trained abrasive engineers are ready to help solve any special grinding or finishing problem that may confront you. Also, without obligation, they will study your present abrasive set-ups, report on its efficiency and, wherever possible, indicate how production can be improved or savings effected. Write to The Carborundum Company, Niagara Falls, N.Y., and a representative will call.

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ABRASIVE PRODUCTS

FOR ACCURACY AND ECONOMY IN MANUFACTURE

OBITUARY

MASON B. GIBERSON Sr., 70, for many years identified with the foundry industry, died Oct. 24 in Detroit. He was one of the founders of the National Foundry Sand Co., Detroit, and had been active in its management since its inception 8 years ago. He was born in Florence, N. J., in 1868 and started as an apprentice with the R. D. Wood Pipe & Foundry Co. of that city. Later he held various executive positions with Kelly & Jones Co., Greensburg, Pa.; Marion Malleable Iron Co., Marion, Ind.; Muncie Malleable Iron Co., Muncie, Ind.; Western Malleable & Steel Co., New Process Steel Co., Marshall, Mich.; Michigan Malleable Iron Co., Detroit.; Monarch Steel Castings Co., Detroit; Pattern & Castings Co., Saginaw, Mich., and Vassar Foundry Co., Vassar, Mich. He also owned and operated the Chelsea Foundry Co,. Chelsea, Mich.

* * *

Jacob J. Walther, vice president, Dayton Steel Foundry Co., Dayton, O., died Thursday, Oct. 20.

* * *

Charles E. St. Clair, 52, works manager, Sivyer Steel Casting Co., Milwaukee, died Nov. 5 while on an inspection tour of foundries in Ohio.

* * *

Wesley G. Nichols, 70, president of the American Manganese Steel Co., until his retirement 5 years ago, died in Chicago Heights, Ill., Oct. 12.

* * *

James J. Donlan, 56, died at his home in Fitchburg, Mass., after a long illness. Mr. Donlan became associated with the foundry business when a boy and for many years was employed by the Goodnow Foundry Co., Fitchburg. Later he opened his own foundry in Gardner, Mass. being treasurer of the Donlan Foundry Co. Mr. Donlan was widely known in the foundry industry and was active in state and New England foundrymen organizations.

Dust Control Group Offers Services

A number of important decisions of interest to users of dust control equipment were made at the Sept. 27 meeting of manufacturers of dust control equipment held at the office of Tuscany, Turner & Associates, Penton Building, Cleveland. The association has been working with the American Foundrymen's association hygiene codes committee on completing codes for various services. A definite program of procedure was developed for continued co-operation with the A.F.A. hygiene codes committee in completion of the metals cleaning and other codes.

The association's co-operation with the New York State Labor department was considered in detail and further work in this direction planned. Report was also made of the association's co-operation with the American Standards association in connection with safety codes for exhaust systems.

It was shown in relation to the Dust Control Equipment association's plans for developing standards of dust control practice that there is a fertile field for closer co-operation between manufacturers of industrial machinery requiring the use of dust control equipment and the manufacturers of dust control equipment. Certain work which has been undertaken in this direction has shown the definite possibility of improved service to the users of equipment and of others interested through a program of this type. Following through on this subject, the Dust Control Equipment association is offering the services of its engineering committee to all manufacturers of industrial machinery in connection with which a dust problem arises. Through this means the inconsistency in design of hoods and other auxiliary equipment can be eliminated.

Detroit Foundries

(*Concluded from page* 31)

rently use the cast barrel type tappet, although some retain the mushroom type steel tappet. The former is claimed to be somewhat less expensive than the steel design. Recent experiments led to further reduction in cost of the barrel type, by virtue of the fact they can be cast without cores—a feat, which upon first inspection, would appear to border on the miraculous but which is reputed to be quite simple. Details are withheld pending patent actions.

Ford is stepping up output of centrifugal castings and is now turning out around 400 sets of step or cluster transmission gears and 100 ring gears daily. This output is from the seven pouring stations installed on the floor level turntable which ultimately can accommodate 18 heads. Three more heads are now in process of being added to the setup—two for ring gears and another for the cluster gears.

Castings for new models at Packard are not changed greatly from last year, and there is no pronounced trend either toward or away from cast iron parts. Minor shifts include a zinc die casting replacing iron for the transmission case cover. The redesigned transmission case cover was occasioned by the elimination of the gearshift lever from the top of the transmission on new models. The zinc cover weighs about 3 pounds, and does not need to show any particular strength in the assembly.

Interesting work in the centrifugal casting of steel tubes is being done here by Michigan Steel Casting Co. The elements are cast horizontally into sand molds and are spun at a speed of around 1500 surface feet per minute, which, depending upon the size of the tube, means a mold speed between 800 and 2400 revolutions per minute. They are made in lengths up to 12 feet and in wall thicknesses down to ⅛-inch. There are a number of tricks to centrifugal casting of this sort, one important matter being careful attention to fluidity of metal, especially on high-alloy materials. Melting of course, is all done in electric furnaces, and the company makes a specialty of high-alloy castings of the type used in furnace parts, sulphite paper mills, oil refineries and the like.

Book Review

Copper in Cast Steel and Iron, cloth, 136 pages, published by the Copper Development association, London.

This recently published volume deals with the use of copper in cast steel and iron, and discusses effect of copper additions upon the mechanical properties of those metals. It attempts to summarize results of recent research on influence of copper in cast steel and iron, and to describe in the light of these results the uses to which copper is being, and may be put, in the foundry.

The book is divided into seven chapters, of which the first is a summary of the uses of copper in cast steel and iron. Chapter II deals with the metallurgical influence of copper on iron-carbon alloys and Chapter III with the influence of copper on graphitization in iron-carbon alloys. Chapters IV and V discuss the effect of copper on the mechanical properties of cast steels and irons, while Chapter VI describes precipitation hardening of copper cast steels and cast irons. Chapter VII deals with the influence of copper on the corrosion resistance of cast steels and cast irons. The book is liberally illustrated and well indexed. Appendices include tables on hardness, temperature, and stress conversion. Copies of the book may be secured by addressing the Copper Development association, Thames House, Millbank, London, England.

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These bags of "Cleanblast" — The Tempered Abrasive—are on their way to prove to users our claims of faster, cleaner blasting operations.

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N.F.A. Holds Meeting

(*Concluded from page 25*)

and needs rebuilding. The most certain sustained lift during the next 6 months may prove to be the base for a much greater business expansion beyond that period. Mr. Cumberland looks for no immediate revision of the Wagner labor act. Action may take a year or more. Some constructive legislation may be expected.

Efforts to eliminate wage differentials for skill should be resisted. Differentials, always slight in Europe, now are even smaller, according to Whiting Williams, Cleveland, who spent several months among European workers recently, studying their economic position. Narrowing of differentials for skill lessens individual and collective economic progress, and aids operations of the professional labor organizer and political leader, Mr. Williams contends.

Taxes Take Heavy Toll

Tracing mounting burden of taxation, Fred R. Fairchild, professor political economy, Yale university, states that taxes, federal, state and local, took 16½ per cent of the 1936 total national income. Failure to balance the federal budget has not been due to a falling off of revenue but to increased spending. The unbalanced budget exerts a retarding influence on industry, curtails investment and slackens enterprise.

Taxation is not a punishment or bribe, but too much legislation has been passed, he said, and too many taxes levied in this spirit in recent years. Taxation, heavy as it now is, fails to pay the cost of government with the federal branch piling up larger deficits. By the end of the current fiscal year the deficit will be close to 41 billions—not a favorable factor for the future outlook. Professor Fairchild contends if expenses were curtailed, the federal budget could be balanced without a general increase in taxes. Comparing the British and American tax burdens, he claimed the average American is taxed practically as much as the Briton when federal, state and local taxes are compared with the single or few British taxes.

At a luncheon session, an inspirational talk on the human element factor in business was given by Victor L. Short, president, Institute of Human Science. He demonstrated a memory test, illustrated his way in sizing and dealing with humans and stressed the importance of training men in the ranks for leadership. He also outlined the advantages of a proper training program for employes.

Added efficiency through good housekeeping, waste elimination and accident prevention results in dividends by reducing costs, according to A. D. Lynch, industrial relations manager, J. I. Case Co., Racine, Wis. A well-planned educational program brings results in all three divisions of plant operations, notably accident prevention in which it is easier to secure 100 per cent co-operation of the employes.

A clean, neat and attractive foundry interior, good housekeeping, begins with planning of work production. Attractive surroundings work toward better and smoother running production and Mr. Lynch suggests housekeeping committees by employes, the personnel of which should be changed from time to time or rotated.

In the creation of waste he listed lack of proper supervision, slack discipline and wasted energy, both human and mechanical, faulty control and operations involving electric current, steam, compressed air, misplacement and use of small tools. If clearly shown the loss in dollars and cents, the average employe will respond. Engineering, enforcement and education he listed as the important factors in accident prevention.

Appoint District Committees

George A. Seyler, works manager, Lunkenheimer Co., Cincinnati, spoke on "This Thing Called Grievance." Comments on the Wagner act and the wage and hour law were made by Otto A. Jaburek, general counsel, National Founders' association.

The following officers of the association were elected for the coming year: Franklin R. Hoadley, Atwood Machine Co., Stonington, Conn., president; William D. Hammerstadt, Rockwood Mfg. Co., Indianapolis, vice president; J. M. Taylor, 29 South LaSalle street, Chicago, secretary-treasurer. A. E. McClintock was re-elected commissioner at a meeting of the executive committee following the close of the business session.

The following members were elected to the district committees: *First district*—Henry S. Washburn, Plainville Casting Co., Plainville, Conn.; Ernest F. Stockwell, Barbour Stockwell Co., Cambridge, Mass.; G. R. Holmes, McLagon Foundry Co., New Haven, Conn.; H. B. Johnson Jr., General Fire Extinguisher Co., Providence, R. I.; R. F. Harrington, Hunt-Spiller Mfg. Corp., Boston.

Second district—Noah F. Young, Lumen Bearing Co., Buffalo; R. H. Goodwillie, Otis Elevator Co., Yonkers, N. Y.; Irving L. Jones, International Heater Co., Utica, N. Y.; P. R. Van Duyne, Meeker Foundry Co., Newark, N. J.; Theodore H. Miller, DeLaval Separator Co., Poughkeepsie, N. Y.

Third district—D. C. Bakewell, Blaw-Knox Co., Pittsburgh; C. H. Hoffstetter, Odin Stove Mfg. Co., Erie, Pa.; James H. Anderson, Cooper-Bessemer Corp., Grove City, Pa.; G. L. Coppage, Pusey & Jones Corp., Wilmington, Del.; George R. Casey, Treadwell Engineering Co., Easton, Pa.

Fourth district—J. S. Tatman, Roots-Connersville Blower Corp., Connersville, Ind.; Charles F. Seelbach, Forest City Foundries Co., Cleveland; Chester A. Feebles, Stedman's Foundry & Machine Works, Aurora, Ind.; A. H. Thomas, Buckeye Steel Castings Co., Columbus, O.; Carl F. Clarke, Monroe Steel Castings Co., Monroe, Mich.

Fifth district—H. G. Myers, Gardner-Denver Co., Quincy, Ill.; H. E. Muchnic, Locomotive Finished Material Co., Atchison, Kans.; A. H. Head, John Deere Tractor Co., Waterloo, Iowa; C. B. Magrath, Greenlee Foundry Co., Chicago; E. L. Berry, Link-Belt Co., Chicago.

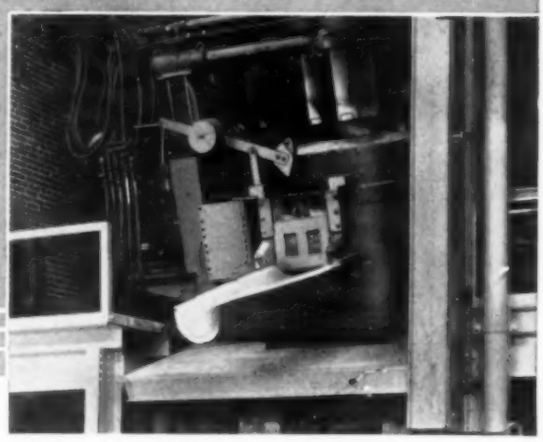
Sixth district—Frederic Crosby, American Hoist & Derrick Co., St. Paul; F. H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.; W. S. Wood, Beloit Iron Works, Beloit, Wis.; C. F. Wehr, Wehr Steel Co., Milwaukee; William J. Grede, Spring City Foundry Co., Waukesha, Wis.

Seventh district—H. E. McWane, Lynchburg Foundry Co., Lynchburg, Va.; A. I. Brainard, Beaumont Iron Works Co., Beaumont, Tex.; G. E. Jones, United States Pipe & Foundry Co., Bessemer, Ala.; W. F. Tynes, Hardie-Tynes Mfg. Co., Birmingham, Ala.; Foskett Brown, Gray & Dudley Co., Nashville, Tenn.

The following past presidents of the association were elected honorary members of the council: Thomas S. Hammond, Whiting Corp., Harvey, Ill.; S. Wells Utley, Detroit Steel Casting Co., Detroit; Thomas W. Pangborn, Pangborn Corp., Hagerstown, Md.

Claude B. Schneible Co., 3951 Lawrence avenue, Chicago, has appointed the following representatives: O. W. Anderson, Los Angeles, for Southern California; Robert M. Taylor Co., San Francisco for Northern California; King Machinery Co., Cambridge, Mass., for the New England states; R. F. Skarnes, Minneapolis, for the North Central territory; and Guy H. Rumpf, for the St. Louis territory. L. C. Beers, formerly sales representative in the New England district has been transferred to the Chicago office and appointed assistant sales manager.

Modern IMPROVEMENTS IN Heroult ELECTRIC FURNACES



TYPE 1½ *Heroult Electric Furnace showing floor tilting, copper tubing, and wedge type electrode holders.*

FOUR major innovations make Heroult Electric Furnaces more efficient than ever —

Floor attached to shell tilts with furnace.

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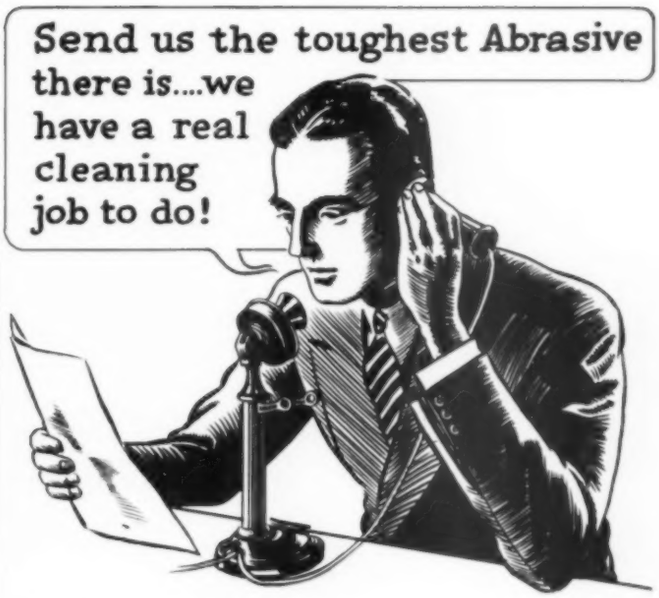
UNITED STATES STEEL



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Write for samples and information

AMERICAN STEEL ABRASIVES CO.
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Brass Pressure Castings

(*Concluded from page* 34)

kept within relatively low limits so that the alloy may not develop the secondary constituent known as the delta constituent. It is a composition of copper and tin which crystallizes out of the alloy to make a hard crystal recognized by many in the bearing fields as the bearing crystal in the copper tin bearing bronzes.

In the composition known as steam or valve bronze, covered by the American Society for Testing Materials specification B 30-36(4), and federal specifications QQB 691, tin is just under the point where it begins to develop this secondary or delta constituent. In consequence, the alloy commonly is known as a solid solution alloy since the amount of copper used up by combining with the zinc still leaves enough copper free to combine with the tin without having the copper-tin compound crystalize out as a secondary constituent. Lead, of course, does not alloy or combine except in very microscopical amounts with the copper. Lead is held in suspension as globules throughout the mass. It is on this account that this alloy has given so much satisfaction in the production of valves for the resistance to leakage under medium or low pressure. That alloy now generally is accepted as one of the best of the modern compositions for the production of many types of steam or water valves.

This is a good illustration of modern development of the right kind of metallurgical compound to meet specific requirement. However, even here different manufacturers produce slightly different alloys. Some hold the zinc around 2 per cent and raise the copper in consequence of the lower zinc. Others insist that they get the best results by using 4 per cent zinc and 88 per cent copper. Either of these limits are permissible under the specifications previously mentioned: these specifications having been drawn so that this range in the zinc may be permitted without developing argument between inspector and producers. Therefore, the recognized steam or valve composition is 88 to 90 per cent copper, from 2 to 4 per cent zinc, 6½ per cent tin and 1½ per cent lead. The latter two elements allow a tolerance of plus or minus ½ of 1 per cent.

Substitution of red metal for yellow has not only occurred in the plumbing and valve manufacturing industry, but some valve makers are using aluminum bronze for valve bodies since this modern bronze is one of the high strength materials. Even at somewhat elevated temperature, the strength still is largely retained. Substitution of bronzes containing nickel for the plain red brasses is now a recognized change for the better since the nickel tends to refine the grain and in many instances gives characteristics that are valuable for the services for which they are designed.

In the realm of bearing alloys there is much debate, and in the realm of gear alloys there is likewise many claims made for many types of alloys. In a future article, the writer hopes to go into the subject of alloys for specific purposes with their methods of production, the limits of chemical compositions that are desirable and other such factors that will be of interest.

Extra! Extra! Extra! Get Your Paper

ONCE a year a few days before Christmas for the past 24 years James L. Mahon, No. 1 man, American Car & Foundry Co., Detroit, lays aside the industrial mantle and dons the newsboy's uniform—see attached spirited illustration—he wore in the days when he sold newspapers on the streets of Detroit. In the old days he wore no gloves and made change for his customers. As No. 1 Newsboy (President to you) of the Old Newsboys Goodfellow Fund he wears a pair of real nifty gloves to indicate that on this particular occasion he don't give no change to nobody.

Once a year tall, dignified, white haired, genial Jim—regardez vous le stance professional — carelessly brushes away the marching years, takes his stand at a down town corner, lifts up his voice in joyful howl and sells more papers than a fairly experienced packer could crowd into a moving van. Assisted by the entire police force of Detroit and by 200 prominent men from all walks of life, one time newsboys and carriers, now members of the Old Newsboys Goodfellow Fund, Jim and his gang put on a charity drive every year to assist Santa Claus in ministering to thousands of needy children. The first year's total was $2000.00. Last year the fund amounted to $148,000.00 and was distributed among 67,000 children. This year the goal has been set at $150,000.00 with every prospect favoring achievement.

Courtesy Detroit Times

Jim in action

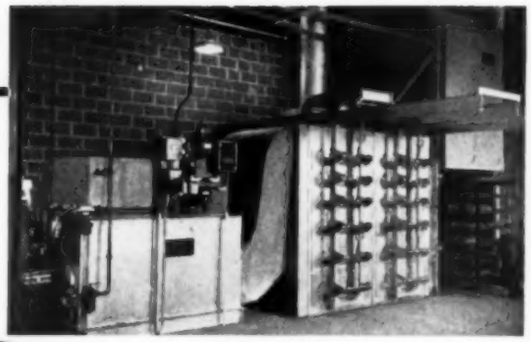
In addition to the proceeds of the paper sale, donations of various kinds are contributed by business interests of the city. Newspapers and radio stations back the movement with whole hearted and joyful publicity. One candy manufacturer for several years has donated approximately 10 tons of candy wrapped in individual gift boxes.

In a city noted for parades, the annual parade of the Old Newsboys attracts more attention and touches the emotions of a greater number of people than any other. Commencing at one of the newspaper offices the parade led by the entire mounted police force and by a volunteer band of over 200 pieces furnished by the Detroit federation of musicians, serenades each newspaper office in turn. At a given point the parade disbands and the old boys, judges, public officials, executives, manufacturers, prominent business and professional men take up their positions at strategic points where they can dispose of the greatest number of papers in a given 2-hour period.

Extra! Extra! Jim's on the job. Stand back boys and give him elbow room!

Will Manufacture New Conveyor

Osborn Mfg. Co., 5401 Hamilton avenue, Cleveland, has purchased the assets of the Johns Conveyor Corp., Newark, N. J., and obtained exclusive rights to manufacture and sell the conveyor. The device consists essentially of a rubber tube formed of two separate halves and solid material in powdered, crushed or broken form is handled with freedom from dust or spilling. Manufacturing operations are being moved to Cleveland and Harry S. Johns, the inventor, will be chief engineer of the Johns Conveyor division of the Osborn Mfg. Co



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Coleman Ovens quickly pay for themselves wherever they are installed. Coleman engineers will gladly recommend the best type ovens to handle your work dependably at the lowest possible cost for fuel and labor.

Why waste money with obsolete baking equipment?

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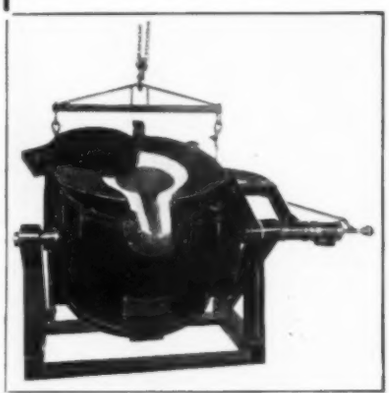
ANOTHER *Fisher* DEVELOPMENT
S.P.C. TILTING MELTING FURNACE



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No Impingement of Waste Gases

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Constant Pouring Arc

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Built Low for Ease in Charging

The Fisher S.P.C. is recommended for melting yellow brass and for pouring into ingot molds or transfer ladles.

Metal losses are reduced to 5% or less when charging borings—1% on solid scrap and ingot metal.

Tilts at the nose—producing a constant pouring arc. Oil or gas fired.

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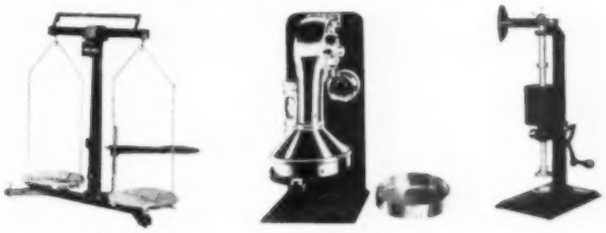
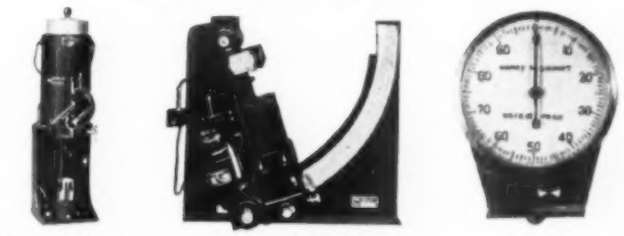
MOISTURE TEST



Balance — *Moisture Teller* — *Sand Rammer*

Control the moisture in molding sand with the Moisture Teller and save castings.

PERMEABILITY — STRENGTH — MOLD HARDNESS TEST



Permeability Meter — *Universal Sand Strength Machine* — *Mold Hardness*

Control molding sand and molds to secure better castings at a lower cost.

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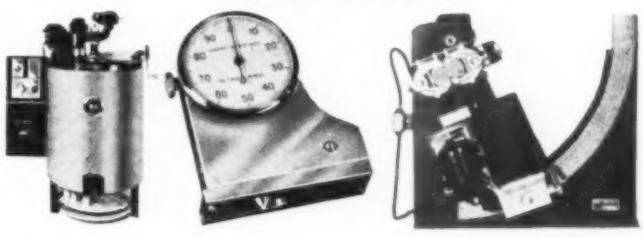

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Measure the properties of cores to improve core room operation and reduce costs.

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Accurate carbon determinations made in two minutes with the Carbon Determinator.

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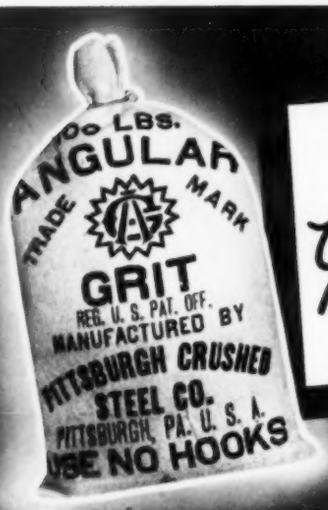

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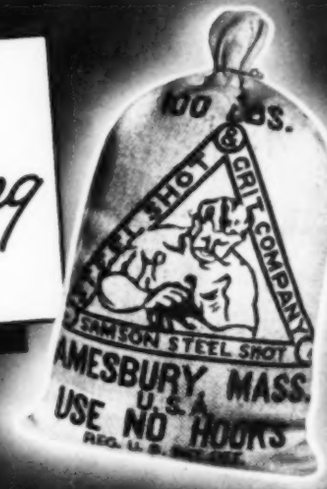

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is without a peer for hardness, cutting action, wearing quality and safety. It will not "break up" in use. It gives off no Dust from itself—hence is a SAFE abrasive for all types of cleaning. It may be easily cleaned and used over and over again at great economy. One ton does the work of a carload of sand.

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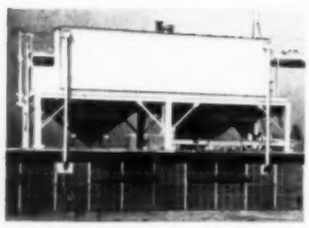
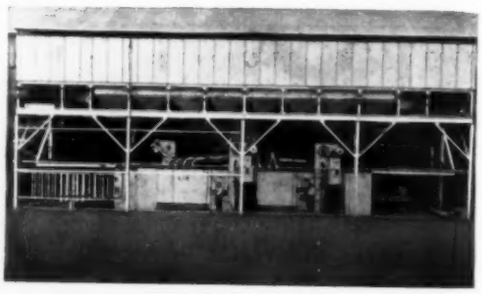
PARSONS DUST CONTROL



SUPER-SERVICE at low cost is "clear" when you use a Parsons Dust Collecting System.

Engineers and foundrymen are quick to notice the "calibre" of equipment.

Whether conditions call for wet or dry systems, they say Parsons is "tops".



PARSONS ENGINEERING CORPORATION
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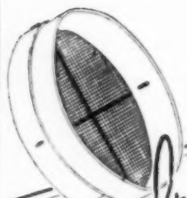

Foundry RIDDLES

HERE is a foundry riddle that will stand the "gaff" because it has been constructed and *designed especially for foundry use.* "Buffalo" riddles are noted for long life and the ability to do faster, cleaner work. It will pay you to try *Buffalo's* the next time you buy riddles.

Available in three stock sizes: 16", 18" and 20" diameter with mesh of either steel, galvanized, tinned or brass wire cloth, supported by two, three or four wires as specified. Ask Us For New Folder No. 91-B

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Reader's Comment

EDITOR'S NOTE—*Material Appearing Under this Head Does Not Necessarily Reflect the Opinion of The Foundry or of Its Editors.*

Experiences

TO THE EDITORS:

While practicing in Germany I ran into a good many interesting foundry problems, and had the advantage of being able to introduce American usage in some of the more important.

I found the average molding practice in some respects better and in many worse than that at home. We Americans are past masters in coring; but for three-part work without cores the Germans often exce' us.

I think our core sand averages much better than theirs—which of course gives us a great advantage at the start. But we are much bolder and more original in coring. For instance, I astonished the natives by proposing—and introducing where permitted—cast-iron and rod cores. In the first-named line, for instance, our stove-founders had long been using wedge-shaped cast-iron cores to make the air passages around the grates. And when it came to wrought-iron rods, I think it was the Philadelphia plant of the Link Belt Co. that solved the problem of getting the bearings of 12-inch links in perfect line by coating the ends of iron rods with sharp coarse-grained sand by dipping them in an adhesive mixture and then rolling them in the sand.

I tried making 4-inch pipe with iron cores, but was not permitted to continue the experiments long enough for the workmen to learn to estimate exactly the time required for the metal to freeze, without, however, gripping the core so tightly that it could not be withdrawn. With short straight sections our experiences there reminded me of Holley's characterization of our early Bessemer work:—"two messes for every blow." My results with quarter-turn elbows were a rank failure—although I know that the government foundry in Frankfort, Pa. turned them out regularly with but few duds.

In one foundry with mass production of small castings, all the molding was done at one end of the building, and the empty flasks to be assembled there. A hydraulic machine rammed them good and plenty, and the men carried them away, filled, to the furnace, when they were taken away "by main strength and stupidness," to a line, where in due time they were shaken out.

The first improvement was to order and install trucks for conveyance of the flasks from sand heap to furnace; the second to transfer the sand heap to the nearest feasible place to the melt.

An attempt was made in another foundry to do mold stacking, which of course causes waste in gating, but once the men learned the art of gating for 3-high work and found the castings, especially the lowest ones, denser than under the old system, they started on 4-high and succeeded fairly well.

ROBERT GRIMSHAW

Leonia, N. J.

Volume Change

TO THE EDITORS:

Results of several years investigation by the writer should be of interest to the vast majority of foundries who apparently still are using core oil by volume. As a result of many years research work, the writer has proved that the average core oil will expand or contract four gallons per thousand for every change in temperature of 10 degrees. This fact can be proved readily by filling a gallon measure with oil when the temperature is around zero, and then placing the can near the core oven to heat. Should the temperature near the core oven be 100 degrees, approximately one twenty-fifth of a gallon of oil will be found to have run out on to the floor.

The reverse takes place if a can of oil is filled during the hot weather when the temperature is, shall we say, 90 degrees Fahr. and then cooled to a temperature of 10 below zero. Approximately one twenty-fifth of a gallon less oil is contained in the can after cooling due entirely to shrinkage.

Although more and more foundries have in recent years offset such effects of temperature by weighing the oil required, a majority of foundries still stick to the old system of using core oil by volume. This antiquated system is directly responsible for the majority of complaints on smoke and obnoxious gases during the winter months.

Here is what actually happens during the course of a year to a foundry which uses core oil by volume, and is situated where the temperature varies 100 degrees between the heat of the summer and the cold of the winter. Assume that the amount of oil required for the mix is exactly one gallon. The foundry concerned in summer has been using a one gallon measure, and with the usual oven heat have been receiving satisfactory cores, that is properly dried cores with sufficient binding strength.

Now let us take a look at the same foundry when the temperature has changed 100 degrees and the plant is operating in winter. The same gallon can, filled for the mixture, really contains one twenty-fifth of a gallon more oil than the same can did in the summer, because the oil had shrunk that much because of the change in temperature. No extra oven heat is provided to bake out the extra oil. Therefore, if the cores were baked perfectly in the summer, it is impossible for them to be baked perfectly in the winter which means excessive gas when the metal is being poured and complaints of smoke and gas both in core room and foundry.

What about the binding strength with the winter mixture? Surely if the cores had sufficient binding strength when the summer mixture was made, then they must have more binding strength than necessary with the extra one twenty-fifth of a gallon oil in the winter mixture.

I strongly recommend that every foundry, no matter how large or small, commence immediately to weigh their core oil, by purchasing a set of bar scales weighing the usual amount of oil that has been used by volume and then keeping to that weight throughout the year. It is advisable, when deciding upon the weight, to weigh the oil at a normal temperature of 60 degrees, if possible.

T. G. WAUGH
President
Certified Core Oil & Mfg. Co.
Chicago

Sales Management

Metropolitan Life Insurance Co., Policyholder Service bureau, 1 Madison avenue, New York, recently has published a report on the "Functions of a Sales Executive," which is based on a survey made by that organization covering 120 manufacturing concerns. Many important trends in the field of sales management were brought out in the course of the investigation. More significant trends include: More careful and scientific sales planning; greater centralization of authority over basic sales policies; increasing decentralization of responsibility for execution of the sales program; sharper division between responsibilities for planning and executing the sales program; increasing application of the principles of specialization of sales work; growing influence of the sales executive in the councils of the company.

NEW EQUIPMENT and SUPPLIES

Combustion Furnace

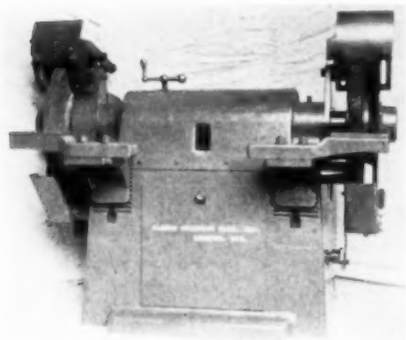
Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, has added a tubular, resistance-type electric furnace to its line of testing equipment. The furnace, shown in the accompanying illustration, is designed to operate continuously at temperatures as high as 3000 degrees Fahr. Its particular field of application is as a combustion furnace for carbon or sulphur determinations in ferrous and nonferrous metals; operating at the usual temperatures of 1800 and 2100 degrees Fahr., and 2400 or 2600 degrees Fahr. for testing high alloy steels. It also may be used in heating rod materials or test specimens to temperatures ranging from 500 to 3000 degrees Fahr.

Resistance type, tubular furnace is designed for operating at high temperatures

Heating element of the furnace consists of a tubular Glo-bar element with an inside diameter of 2 inches. It is claimed that the heat is applied efficiently and uniformly around the material being heated. Overall length of the furnace is 19¼ inches, but it may be secured in lengths up to 30 inches. Temperature of the furnace is controlled manually by a step voltage transformer, or automatically by a pyrometer controller. It is claimed that the furnace is well insulated, and is simple and sturdy in construction.

Grinding Machine

Ransom Grinding Machine Co., Oshkosh, Wis., has placed on the market a new constant periphery speed grinder for use with vitrified-bond grinding wheels 24 inches in diameter. The machine contains a device through which the speed of the machine is adjusted to maintain a surface speed of 6400 feet per minute as the wheel wears down from 24 inches to 10 or 11 inches in diameter. The machine is driven by a 5 or 7½ horsepower, totally enclosed, fan cooled, ball bearing motor suitable for any direct or alternating current.



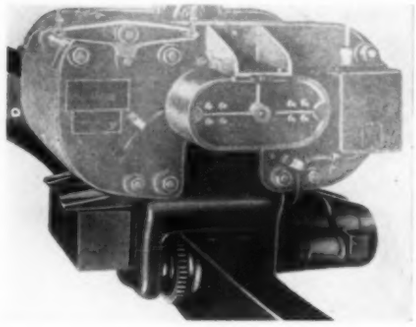
Speed changing unit on grinding machine permits adjustment to obtain constant peripheral speed

The starter is an across the line, remote control type with overload and undervoltage protection. The starter is enclosed and mounted in the base of the machine. Start and stop push button is mounted conveniently on the front of the machine. The speed changer or control unit is enclosed, fan cooled, and mounted on the base at the back. Drive within the speed changer unit, and from the unit to the spindle is by texropes. Wheel guards have hinged doors, spark arrestors adjustable to wear of the wheel, and exhaust pipe connections. Rests are adjustable in all directions, and have steel lined surfaces which can be renewed when worn.

Motor Trolley

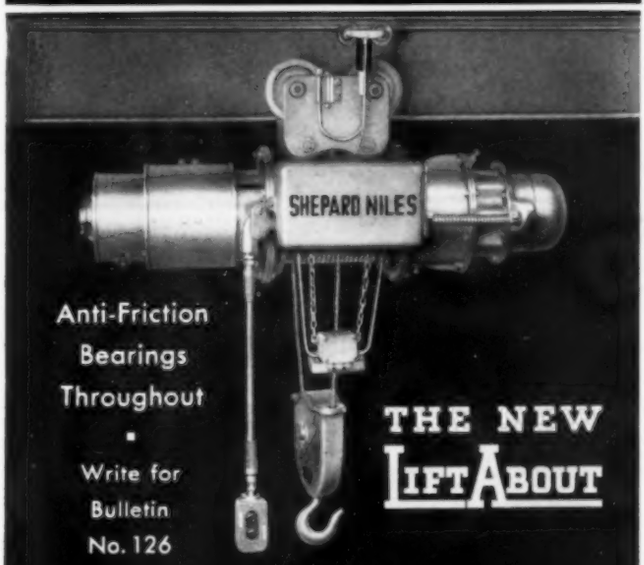
American Engineering Co., 2418 Aramingo avenue, Philadelphia, has developed a new motor trolley for use with its low head hoists. The trolley, shown in the accompanying

(*Continued on page 92*)



All four wheels of the trolley are gear driven

The Modern Electric Hoist



Anti-Friction Bearings Throughout

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A COMPLETE LINE OF CRANES AND HOISTS

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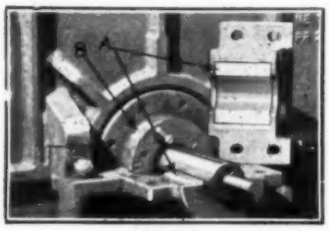
BLYSTONE MIXER

has many IMPROVED *features*

AND DOES NOT GRIND MATERIALS

You will find many improved features in the NEW Blystone Mixer which contribute to efficient operation and reduce mixing costs to the minimum. One of the most important features from your point of view is that the Blystone Patented Reverse Spiral Shovel System mixes QUICKLY and THOROUGHLY —WITHOUT GRINDING MATERIALS. Many Foundries have found it paid to replace old mixer with a NEW Blystone. Be sure not to confuse the Blystone SHOVEL type with paddle type mixers.



DIE-CAST BEARINGS SAVE YOU MONEY

Old and worn out bearings must be replaced occasionally, and this can be done without the loss of time on the NEW Blystone Mixer. The operation is simple,—you merely remove bearing cap, take out old bearing, and put in a new one.

•

WE SUPPLY REPLACEMENT PARTS ON ALL MODELS

•

The Blystone Patented Reverse Spiral Shovel System

Write for Literature

BLYSTONE MANUFACTURING CO.

1238 Grant St. Cambridge Springs, Penn.

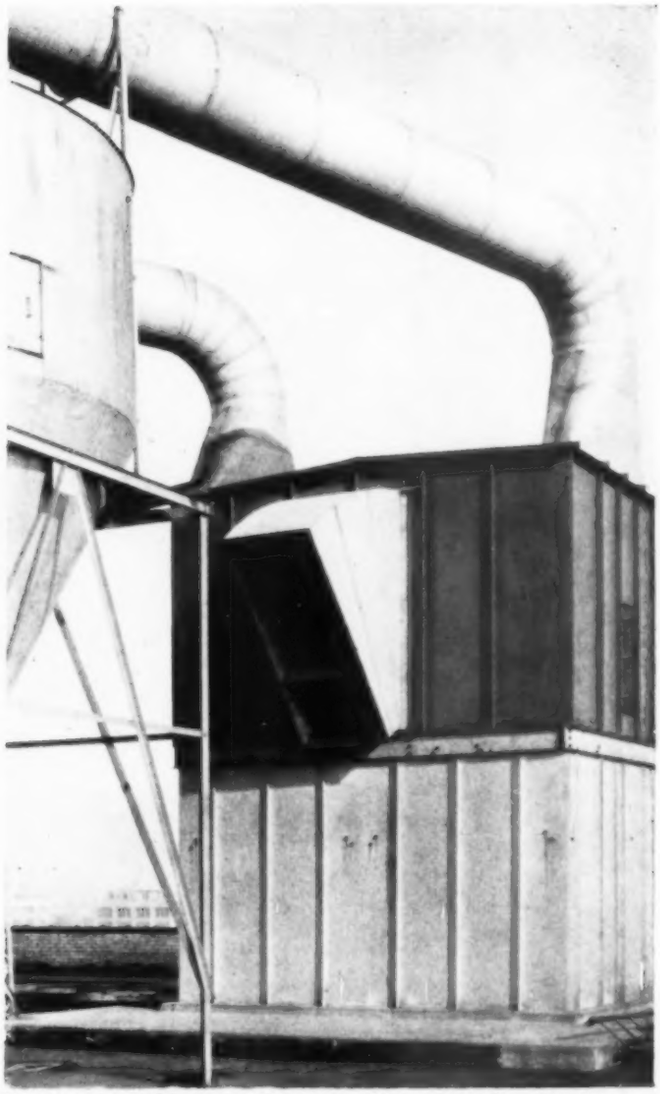


Illustration shows K&B "Cyclone" Dust Collector (left) and Cloth Screen Dust Arrestor

Put Your Dust Collecting Problems *up to* Experienced Engineers . . .

In Kirk & Blum installations either the "Cyclone" Dust Collector, Cloth Screen Dust Arrestor or Wet Collector (Precipitator) is used, singly or in combination, the selection determined by the conditions to be met. Our Engineers, who have solved the dust and fume removal problem for many of the country's industrial leaders, will make a thorough survey of your plant and recommend the type of system most suitable to meet your specific requirements. Write for details of this service and copy of new interesting books, "Dust Collecting Systems for Metal Industries," "Fan Systems for Various Industries."

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Designers and Builders of Dust Collecting, Fume Removal, Ventilating Systems — Industrial Ovens — Pickling and Plating Equipment, Etc.

Chicago Representative: C. P. Guion, 1661 North Milwaukee
Pittsburgh: Bushnell Machinery Co., 311 Ross Street
Louisville: Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

KIRK & BLUM
Dust Collecting Systems

(*Continued from page* 90)

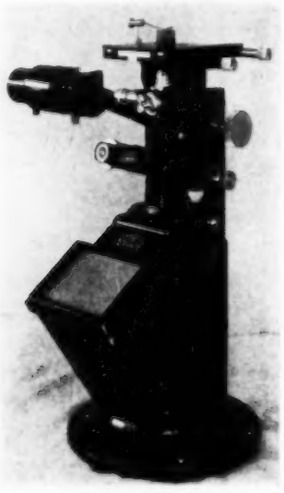
illustration, has a short wheel base, low head room, 4-wheel drive, and is balanced. Curves with a radius down to 7 feet can be negotiated. Head room varies from 1 foot 9 inches to 3 feet 10 inches depending on capacity of hoist and height of lift.

Four trolley wheels are gear driven, and balance is secured by an adjustable counterweight. Trolley wheel and gear shaft bearings are heavy duty, roller type, and trolley wheels are cast steel. Motor is ball bearing, fully enclosed, and designed for hoist service. Controller is the drum type, fireproof, and protected from dust and moisture. It is operated by pendant cords, but special controls are available.

Microscope

George Scherr Co., 128 Lafayette street, New York is introducing a metallurgical microscope of radically new design, as shown in the accompanying illustration. It is a combination microscope and photographic camera assembled into a permanently aligned unit. Instead of a bellows the camera is equipped with a device which changes the magnification of any eye piece optically at the turn of a dial. The ground glass remains always in the same fixed position.

It is stated that the continuous series of magnifications from 100 to 2000, obtained thereby, is highly desirable when definite magnifications are needed. The lamp house may be tilted for inspection of surfaces. The inverted type stage of the microscope accommodates polished or fractured specimens of any size or shape. Illumination can be changed instantly from bright field to dark field, vertical or oblique illumination.



Metallurgical microscope is a combination of microscope and camera

Grinding Machines

U. S. Electrical Tool Co., Cincinnati, has introduced a new line of grinders termed model No. 500. The grinders, one of which is shown in the accompanying illustration, are available in five sizes from ¾ to 5 horsepower in 3 phase, 50 to 60 cycle, 220 or 440 volts. The motors

Grinding machine motor is enclosed to prevent dust entrance

are totally enclosed, and it is claimed no dust, dirt or abrasives can reach the bearings, motor windings or rotor.

Antifriction ball bearings are lubricated permanently. Wheel guards are of the hinged type, enclosed with exhaust connections, and are adjustable to wheel wear. Tool rests are adjustable, and mounted on the pedestal. Heavy extended shaft is said to give ample room for two operators. The grinders are supplied with tool tray, water pot and push button starter with overload protection.

Screw Conveyors

Chain Belt Co., Milwaukee, has added a new line of screw conveyors and steel buckets. Rounding out of the line formerly produced by the company, has been made possible through the acquisition of machinery and drawings of the Weller Mfg. Co., Chicago.

Respirator

Willson Products Inc., 262 Thorn street, Reading, Pa., has placed on the market a low resistance chemical cartridge respirator, shown in the accompanying illustration, which is designed especially for plating, brazing, paint spraying operations and for use in light concentration of organic vapors and acid gases. The respirator, available in either 100 or 190 cubic centimeter content, employs two replaceable cartridges which present low breathing resistance. Extra large cartridges afford an unusually large de-

Chemical cartridge respirator designed for plating, brazing, spraying, etc., operations

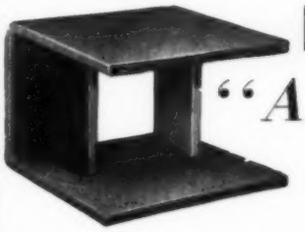
gree of protection. A new form fitting rubber face piece conforms to the face, is out of the way and permits clear visibility. It is claimed that spectacles or goggles may be worn with comfort and the entire unit is so compact it may be worn with comfort under a welder's helmet. Three separate chemical fills are available depending on the use to which the respirator is to be put.

Portable Pyrometer

Foxboro Co., Foxboro, Mass., recently has introduced a new portable indicating potentiometer pyrometer shown in the accompanying illustration. Built primarily for temperature measurements where a permanent installation is not required, this meter also is useful for testing and standardizing service instruments and thermocouples, for exploratory work and as a spare instrument. The instrument is equipped with a large metal handle and finished in crystalline enamel. An aluminum case provides pro-

(*Continued on page* 94)

Case is equipped with handle on the outside and spring clip for record sheets on the inside



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"MEET" the new addition to our line, and a fit companion to the famous MILWAUKEE THREAD STEM Single and Double Head Chaplets.

"Use" MILWAUKEE 'ANGLE' CHAPLETS—they are indispensable for some jobs. Write for prices and information. Also test our unequaled service.

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Manufacturers of Foundry Chaplets, Galvanized Riddles, Kordo Core Paste, Tripolex and Non Silica Partings

for HEAVY FOUNDRY SNAGGING . . . . CUTTING OFF . . .

MANHATTAN ABRASIVE WHEELS

Grind accurately, wear evenly and do your job at lowest cost. Engineered for the task after careful study of conditions. Consult our

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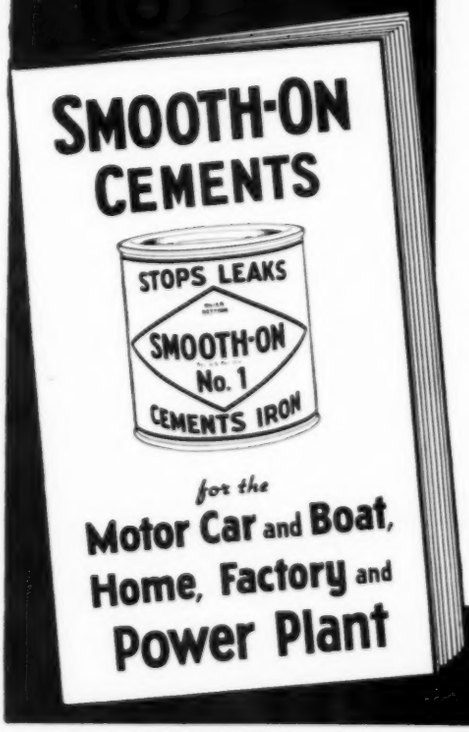
NEW ENLARGED EDITION — 25% more information and diagrams

A veritable encyclopedia of good repair and construction practice



THIS Handbook enables any Fouadryman to make countless routine and emergency repairs quickly, easily, at low cost and with assured results. By following its instructions and diagrams, you can fill in surface defects on iron, steel, bronze or white metal castings, prevent or stop fluid and pressure loss at cracks and joints in boilers, steam, air or pump cylinders, valve decks, pipe lines, condensers, feed heaters, stills, tanks, etc., seal porous spots in cast metal, tighten stripped bolts, nuts or screws, anchor parts to wood, metal or masonry, make rigid machine base contacts and oil-proof foundations, seal cracks against the corrosive action of moisture, prevent the entrance of ground water through floors, walls, sumps, machinery pits, etc., harden or patch concrete floors—all with least effort, time loss and expense.

For over 40 years the Smooth-On Iron Cements have been used by foundrymen and in power plant repair and construction work. Constant improvement in the composition of the different Smooth-On Cements is being made by laboratory experimentation. For instance, the hardness, strength and working time of Smooth-On Iron Cement No. 1 have recently been doubled. Easy to apply, without tools or heat. Just mix the water.

The new Handbook is up-to-date with new uses found by test and from experiences of the many Smooth-On users. Its information is valuable, and should be on every Engineer's desk.

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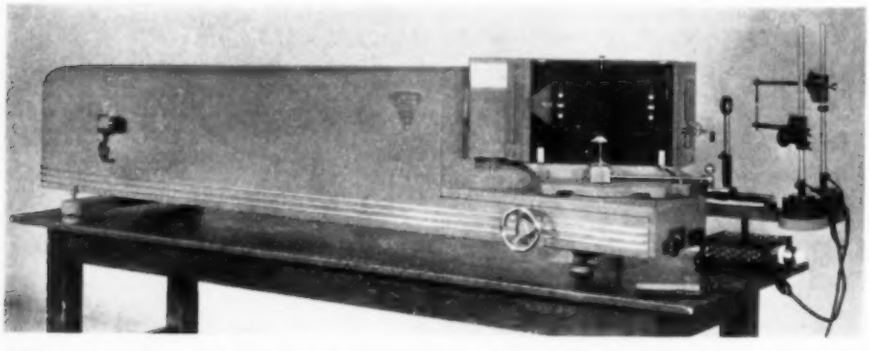
Do it with SMOOTH-ON

(*Continued from page 92*)
tection against dirt, acids, high temperatures and abrasion. A spring clip inside the removable lid will hold data sheets or other records. An open legible scale 17 inches in length makes it possible to obtain readings to very close limits. Double range instruments have two scales, both of which may be for temperatures and for the same or different thermocouples. Each scale can be calibrated for millivoltage, or one for millivoltage and one for temperature. Single range instruments are equipped with one scale, either for temperature or millivoltage. The instrument operates either horizontally or vertically.

Spectrograph

Bausch & Lomb Optical Co., Rochester, N. Y., recently has designed a change in the housing of its large Littrow spectrograph by streamlining, and changing the finish from black to gray shrivel lacquer. Optical bed on the illuminating unit is of a new form to give more accurate adjustment of the parts mounted on it. Clamp bases for supporting the condensing lenses and sector mount have been redesigned to fit the new bed.

It is claimed that improved performance has been achieved in the sector photometer by the use of a single disk with two sets of sector openings properly placed to intersect the two light beams. One pair is fixed, with openings transmitting light through two opposite quadrants, as in the former fixed aperture sector. The other pair is adjustable and has percentage and density scales. Such construction is said to eliminate slippage between the two disks. The new sector is mounted so that the light passes through it before it strikes the sample. Thus the sample receives the light only during the fraction of time when the light is passing through the sector opening instead of continuously.



Illuminating units and sector photometer are finished to match housing of spectrograph

Respirator

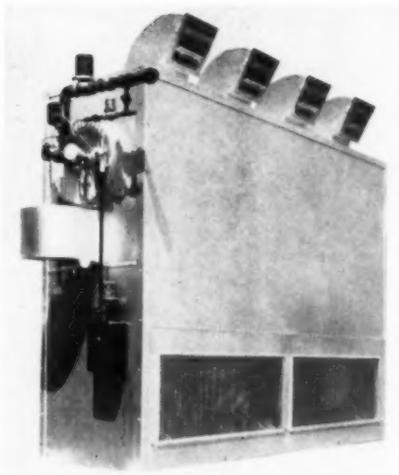
H. S. Cover, South Bend, Ind., has developed a new, rubber constructed respirator for use where injurious gases and fumes prevail. The unit, shown in the accompanying illustration, is a twin filter type equipped with twin cartridges containing special charcoal for organic vapors, soda lime for acid gases, and silica gel for ammonia gas. It is claimed that the cartridges are easily removable, and quickly replaced by new ones when desired.

Air filter apertures have been placed back at the cheek location for uniform weight distribution. Exhalation valve has been located close to mouth for elimination of breathed air. Face piece is soft rubber to make a tight fit. A face cloth is provided for comfort and as a safeguard against dermititus.

Respirator has twin filters and twin absorbent cartridges

Unit Heater

Surface Combustion Corp., Toledo, O., recently has placed on the market a gas fired unit heater shown in the accompanying illustration for operating on manufactured, natural butane or propane gas. The unit has an input capacity of 1,250,000 btu's per hour and an output of 1,000,000 btu's. Air delivery is 10,000 cubic feet with an average temperature rise of 125 degrees Fahr. Air velocity is approximately 2500 cubic feet per minute making possible a throw of approximately 175 feet with an outlet temperature of 175 to 185 degrees Fahr.



Unit heater operates on manufactured, natural, butane or propane gas

The unit of floor type design is 3 feet in width, 8 feet 3 inches high and 10 feet 9 inches in length and is equipped with four air outlets, each equipped with horizontal adjustable louvers. Each outlet is located on top of the heater and can be rotated through a complete circle. Ducts may be attached to the outlets if desirable. Air is circulated by two large fans. A third fan for delivering air to the burners is mounted on the common fan shaft driven by a 7½-horsepower motor. Controls include all necessary protective devices and thermostat for complete automatic operation.

Dust Collector

Sturtevant Mill Co., Park and Clayton streets, Dorchester, Mass., has developed equipment for dust removal from the air through a combination of centrifugal force, wet impingement and washing. Units, one of which is shown in the accompanying illustration, are designed in numerous sizes and capacities to meet various conditions.

Dust is precipitated as sludge in the de-watering tank part of the system and the water is recirculated. If the dust is to be collected in dry form, it is separated in a second chamber. In handling fumes, smoke, fly ash and dust at high temperatures a combination type unit is employed. One chamber serves as a precooler and trap for the heavy

(*Concluded on page 96*)

8 BIG FEATURES

Distinguish This Economical

U. S. MODEL NO. 68 GRINDER

Write for new Catalog No. 52

Constant speed increase for all wheel diameters; constant rate of grinding; more cutting . . . less wheel wear; four heavy bearing spindles; enclosed and sealed ball bearings; safety adjustable boiler plate wheel guards; ease of belt adjustments; low maintenance costs.

THE UNITED STATES ELECTRICAL TOOL CO.

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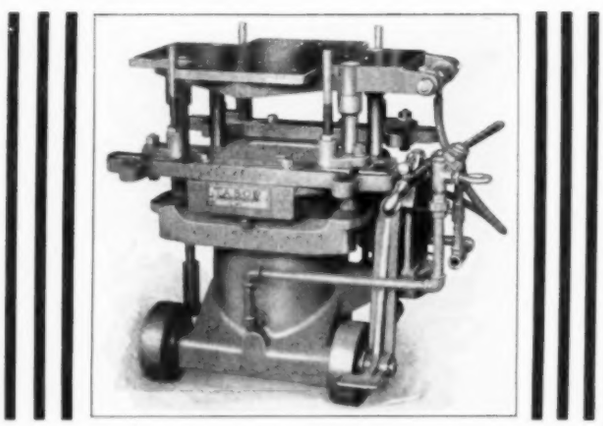
One of the Complete Line of

TABOR Profit Producers

TRADE 1884 MARK



JAR FLASK LIFT MACHINE WITH ADJUSTABLE PINS

Lifting pins provide for a wide range of flask sizes. A machine for fast production —particularly adaptable to cope molds.

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Foundry Molding Machines and Equipment

Compare CURTIS design and construction features with other compressors. You will find CURTIS engineered to give lasting, carefree performance—a result of 84 years' experience in building fine compressors. For this reason CURTIS owners are enjoying dependable air service at a minimum cost for power, maintenance and repairs. Specific instances of savings reported by Curtis owners sent on request. Check these Curtis features:

CENTRO-RING OILING—Positive pressure. Only one moving part.

TIMKEN ROLLER BEARINGS—Less friction—adjustable for wear.

CENTRIFUGAL UNLOADER—For automatic no-load motor starting.

CARBON-FREE DISC VALVES—Fully enclosed crankcase . . . All parts readily accessible . . . Vertical & V-type cylinders, saves floor space . . . Capacities up to 360 CFM.

SEND COUPON for new, 28-page free booklet, "How Air Is Being Used in Your Industry." The coupon will also bring you service reports, full description and prices of Model "C" compressors.

CURTIS Air Hoists • I-Beam Cranes • Trolleys

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Gentlemen: Please send data on Model "C" compressor, and your new booklet.

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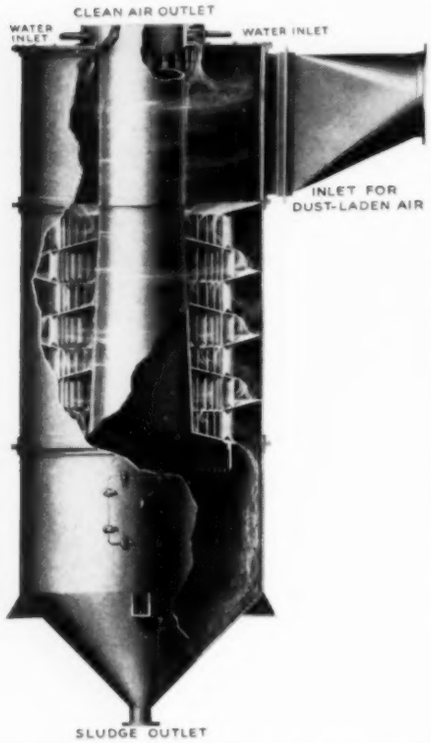
(*Concluded from page* 94)

dust while the air passes to the second chamber for final cleaning.

Dust laden air enters the top of



A water spray is designed to catch incoming dust-laden air near the top of the chamber

the unit tangentially and receives an initial wetting during the whirl in the top part of the collector. The large wetted particles serve as carriers of the fine particles. The action continues spirally downward. Water, air and dust pass through the many bladed sections where the water is broken into a fine spray to carry foreign material to the bottom.

Height Gage

George Scherr Co. Inc., New York, is marketing a precision tool which may be used as both a vernier caliper and a height gage. Improved feature is a combination cam lock and fine adjusting screw which permits easy setting to close limits of accuracy. Cam lock is released by pressing the fine adjustment screw until approximate measurement is obtained. Then, to secure fine measurement in 1/1000 inches, the adjustment screw is turned, while the cam lock remains closed. This precision instrument comes with lapped steel base and scriber attached to the caliper jaws which transform the tool into a height gage. It also has two knife-edges for layout work, for measuring distances between holes, and for measuring root diameters of gears and threads.

Grinder, Polisher

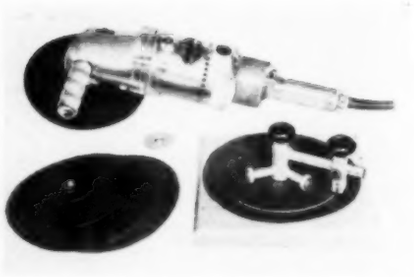
Hammond Machinery Builders Inc., 1605, Douglas avenue, Kalamazoo, Mich., recently has introduced a new type combination grinder and polisher shown in the accompanying illustration. This is an overhanging spindle machine and is claimed to be especially desirable for large bulky work where extra space around the wheel is at a premium. The top section over hangs 12½ inches from the lower front of the base. Spindle is 52 inches long and the grinder end is equipped with a 14-inch diameter guard.

Standard equipment includes: Combination switch and brake enabling the operator to shut off motor and spindle instantly; spindle lock which holds spindle securely when changing wheels; automatic motor starter with overload and low voltage protection; motor in the base with *multi-V* belt drive. It is claimed that this combination machine not only will be of particular interest to those handling bulky work, but also to those who have not enough production work to warrant a single purpose grinder and polisher. In many plants it will serve the purpose of two machines.

Top section overhangs in this combination grinder and polisher

Electric Sander

Van Dorn Electric Tool Co., Towson, Md., has announced a 2-speed sanding unit for use with both 7 and 9-inch abrasive disks, eliminating necessity of two tools of different speeds. Speed adjustment is obtained by a simple gear shift arrangement in gear housing which alternately engages two different sets of double gears. Armature and intermediate gears are spiral and spindle gear is spiral-bevel. Unit is equipped with special gear locking pin to facilitate interchange of flexible pads.

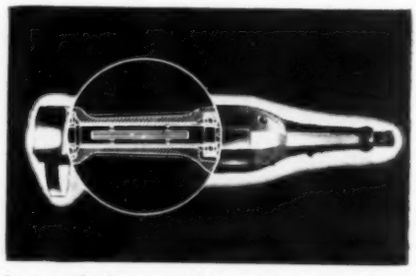


This two-speed electric sander may be used with both 7 and 9-inch disks

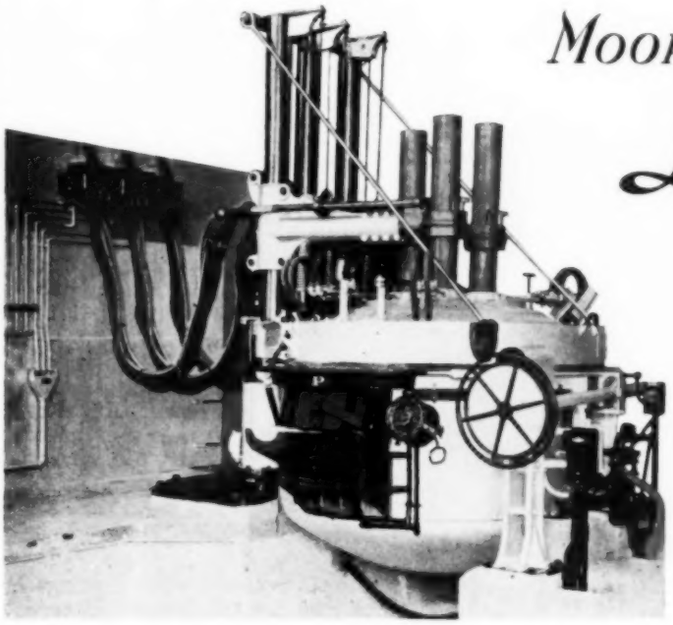
It is possible with this machine to get maximum wear from a 9-inch disk; by trimming off worn outer surface a 7-inch disk that is practically unused is obtained. A disk cutter is provided with each unit. No-load speed for 7-inch disks is 4200 revolutions per minute, and for 9-inch disks 2700 revolutions per minute. A universal motor, operating on alternating or direct current, is standard equipment.

Portable Grinder

Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago has developed a new type portable electric grinder in three sizes, 4, 5 and 6-inch wheel capacities. It is claimed that these grinders are practical for use even on production work where constant severe service is required, through a newly perfected method of vibration control. A simple change in the basic design of the spindle, substitution of resilient steel strips for a single solid piece prevents vibration. The 4-inch grinder is recommended for fast grinding on light jobs. It weighs 10 pounds, is 19 inches in length and operates at a free speed of 6000 revolutions per minute. The 5-inch size weighs 10¼ pounds, is 19½ inches in length and runs at a free speed of 4500 revolutions per minute. The 6-inch size, designed for the hardest kind of work weighs 20 pounds, is 24½ inches in length and has a free speed of 6000 revolutions per minute. A booklet with complete specifications and prices is available upon request.



A new design provides control of vibration of the portable grinder



Furnaces available in top charge type with quick raise and swing roof—also in door charge types.

Moore Rapid

Lectromelt

Furnaces

for

MELTING
REFINING
SMELTING

Alloy and Carbon Steels
Gray and Malleable Irons
Copper and Nickel and Alloys
Ferro-Alloys, Carbide, and Special products

RAPID—ECONOMICAL—RUGGED

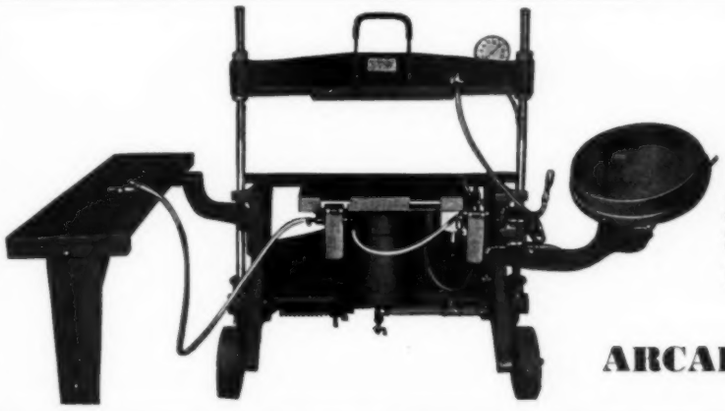
PITTSBURGH LECTROMELT FURNACE CORP.
Foot of 32nd Street, Pittsburgh, Pa.

TIECO FOUNDRY LADLES . . .

Use TIECO foundry ladles and you use the best ladles that money will buy! *Made in all types and sizes* for more efficient, profitable foundry production. Day in and day out in foundries all over the country, TIECO foundry ladles are proving their worth. It will pay you to write today for descriptive literature.

DEPENDABLE
STURDY . SAFE

THE INDUSTRIAL EQUIPMENT CO.
115 OHIO ST., MINSTER, O.



DEPENDABLE JOLT SQUEEZERS

	No. 81	No. 91	No. 101
Jolt Cyl.	3"	4"	5"
Squeeze Cyl.	8½"	10"	13"
Between Uprights	32"	36"	38"

ARCADE MANUFACTURING CO.
Freeport, Illinois

FOUNDRY ACTIVITIES

THE BIRDSBORO STEEL FOUNDRY & MACHINE CO., Birdsboro, Pa., recently purchased additional plant facilities in a portion of the plant of the Reading Iron Co. on North Eighth street, Reading, Pa., known as the Scott foundry department. The property comprises an erection shop 203 x 150 feet, which already is in use by the Birdsboro company as a machine and erecting shop; an L-shaped foundry 303 x 230 feet; a bolier house 54 x 38 feet; and a machine shop 230 x 102 feet which will be used for the manufacture of machine parts; and an office building 40 feet square. The additional plant facilities will be used by Birdsboro in the manufacture of new line of sheet grinding machinery and abrasion products, and also for the further development of other Birdsboro lines.

* * *

Great Lakes Foundry Corp., Milwaukee, has been incorporated by Hy Conkel, Frank Mareno and Joseph Liberatore to deal in various metals.

* * *

Harrison Radiator Corp., Lockport, N. Y., has plans for alteration of its plant at an estimated cost of $40,000. J. M. Tully, Lockport, is engineer.

* * *

Richardson & Boynton Co., Whitesboro, N. Y., is taking bids for additions to its plant costing in excess of $40,000. The engineers are Eadle, Freund & Campbell, New York.

* * *

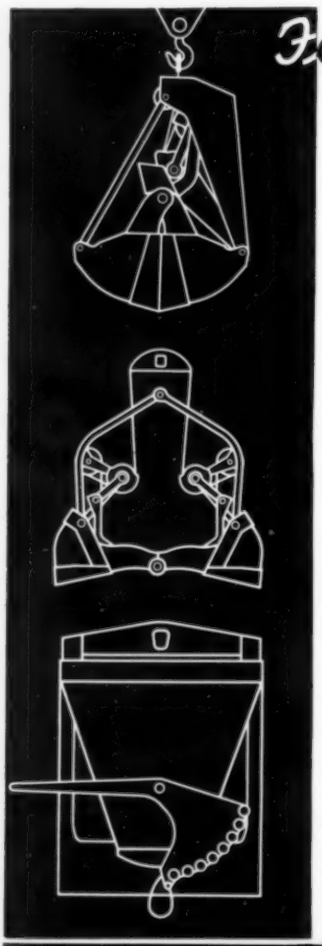
Texas Foundries Inc., Lufkin, Tex., W. C. Trout, president, recently incorporated with $450,000 capital, has let contract for construction of plant in which it will manufacture malleable iron casting for heavy machinery.

* * *

Marengo Foundry Co., Marengo, Ill., signed final papers for the construction of a new foundry building.

(*Concluded on page* 100)

BLAW-KNOX
BUCKETS
For Foundry Service



The popular hook-on bucket for handling sand, coke, coal, etc. Adaptable to a broad range of service and multiplying the value of your crane investment.

A Hook-on type of bucket built especially to meet the requirement of extremely limited head room clearance for operation.

The roller gate dump bucket presenting the first practical means of obtaining controllable discharge for delivering sand to floor or flasks, etc.

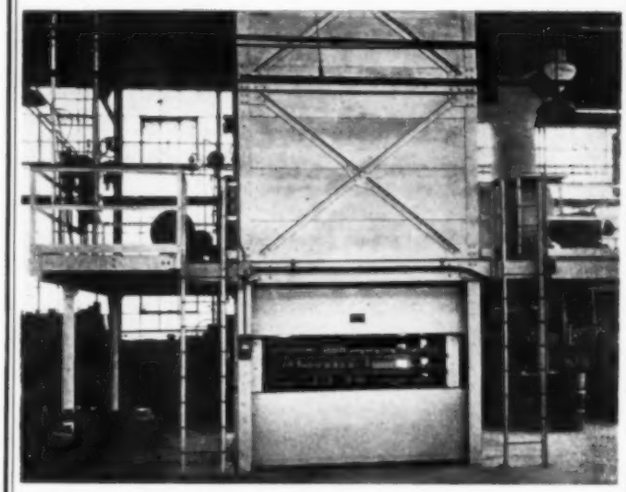
ADDRESS INQUIRIES TO

BLAW-KNOX DIVISION
★ OF BLAW-KNOX COMPANY ★
2097 Farmers Bank Building • Pittsburgh, Pa.

RAW MATERIAL PRICES
Nov. 22, 1938

Iron		
No. 2 foundry, Valley		$21.00
No. 2 Southern Birmingham		17.00
No. 2 foundry, Chicago		21.00
No. 2 foundry, Buffalo		21.00
Basic, Buffalo		20.00
Basic, Valley		20.50
Malleable, Chicago		21.00
Malleable, Buffalo		21.50
Charcoal iron, furnace		25.00
Coke		
Connellsville beehive premium	$5.75 to	$6.25
Wise county beehive coke	5.50 to	6.50
Detroit by-product delivered		10.25
Scrap		
Heavy melting steel, Valley, No. 2	$13.50 to	$14.00
Heavy melting steel, Pittsburgh, No. 2	14.25 to	14.75
Heavy melting steel, Chicago, Auto No. 2	11.50 to	12.00
Stove plate, Buffalo	13.00 to	13.50
Stove plate, Chicago	8.50 to	9.00
No. 1 cast, mchy. New York	12.00 to	12.50
No. 1 cast, mchy., Chicago	12.50 to	13.00
No. 1 cast, Pittsburgh	15.25 to	15.75
No. 1 cast, Philadelphia	16.50 to	17.00
No. 1 cast, Birmingham	14.00 to	14.50
Car wheels, iron, Pittsburgh	15.00 to	15.50
Car wheels, iron, Chicago	14.00 to	14.50
Railroad malleable, Chicago	15.00 to	15.50
Malleable, Buffalo	13.50 to	14.00
Nonferrous Metals		
		Cents per pound
Castings copper, refinery		10.77½
Straits tin		46.00
Aluminum, 99 per cent		20.00
Aluminum, No. 12 (Secondary, standard)	14.00 to	14.50
Lead, New York		5.10
Antimony, New York		12.25
Nickel, electro		35.00
Zinc, East St. Louis, Ill.		4.75

VERTICAL CORE OVENS
By
Carl-Mayer



Oil Fired Vertical Oven—Patent Pending, built for a General Motors Subsidiary

Also all

OTHER TYPE CORE AND MOLD OVENS

Write for literature to:

THE CARL-MAYER CORP.

3030 EUCLID AVE. CLEVELAND, OHIO

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"Don't Accept A Substitute"

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Carried in stock by the leading Foundry Supply Jobbers.

ROBESON PROCESS COMPANY
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CARLOAD SHIPMENTS:
GLUTRIN . . from AuSable Forks, N.Y. and Erie, Pa.
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New AND Improved!
IN DESIGN AND COMFORT

Lightweight—total weight complete, 3¾ oz. . . . *Compact*—full vision in every direction; no interference with goggles or any head covering . . . *Low breathing resistance*—has large filter, compactly folded... *Easy to maintain*—all parts, including rubber face-cushion easily replaceable; may be completely sterilized... *Foolproof exhalation valve*—U. S. Army Gas Mask-type, most positive, leakproof valve ever designed, provides drainage when necessary. *These outstanding features* are combined with U. S. Bureau of Mines-approved protection against harmful dusts and easy day-long wearing comfort, in smaller dimension than any other dust respirator on the market! Investigate the modern aluminum and rubber DUSTFOE. Write today for its complete story in Bulletin F-CM-2!

MINE SAFETY APPLIANCES COMPANY
Braddock, Thomas and Meade Streets, Pittsburgh, Pa.
District Representatives in the Principal Cities

The Dustfoe RESPIRATOR

U. S. BUREAU OF MINES Approval No. 2115

DEMONSTRATIONS ON REQUEST

(*Concluded from page* 98)

The company recently was incorporated by W. T. Milles, president and treasurer; Charles T. Milles, vice president; and Anthony Galos, secretary. The new foundry will manufacture light gray iron castings and operations expect to be started by Jan. 1. The plant will give employment to approximately 12 men, increasing to 50 later.

* * *

Nick Glaviano and Frank Casalicchio, Alhambra, Calif., have obtained a certificate to conduct business under the firm name of Alloy Brass Foundry at 2454 East Fifty-seventh street, Los Angeles.

* * *

Index of foundry equipment orders for October, according to a report of the Foundry Equipment Manufacturers' association, Cleveland, was 87.9 as compared with 78.7 in September and 185.3 in October, 1937. Index of shipments was 93.4 as compared with 84.2 in September and 232.3 in October, 1937.

* * *

Navy department has awarded contract to the Moore Dry Dock Co., Oakland, Calif., for construction of a new foundry building at the Mare Island, Calif. navy yard. The cost of the building will be $229,675.

* * *

Walnut Hills Foundry Inc., Wabash, Ind., was incorporated with 500 shares, no par stock by Clarence Dye, James Barroda, Wilbur Barroda and Soarn Nelson. The company will manufacture rough gray iron, aluminum and brass castings. Clarence Dye is resident agent.

* * *

Renown Stove Co., Owosso, Mich., recently celebrated its thirtieth anniversary by holding open house. J. Edwin Ellis, president, presented gifts to six men who have worked with the company for the entire 30 years.

NEW TRADE PUBLICATIONS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing THE FOUNDRY, in care of Readers' Service Department, 1213 West Third Street, Cleveland

CLEANING—American Foundry Equipment Co., Mishawaka, Ind., has revised its Wheelabrator Tum-Blast catalog. Included are photographs showing various models in operation, construction and cleaning ability, as illustrated by photographs taken of various articles before and after being cleaned by the machine. The text includes engineering surveys on performance of various installations.

REFRACTORIES — "The Refractory Firestones of Ohio" is the title of an 8-page leaflet by E. A. Burr recently issued by the Cleveland Quarries Co., Cleveland. Leaflet describes the deposits, structures of the rock, and quarrying operations.

REFRACTORIES—Refractory & Insulation Corp., 381 Fourth avenue, New York, has issued a small folder describing the properties and uses of its insulating blocks. Applications, specifications and list prices are given.

MATERIALS HANDLING—Edgar E. Brosius, Inc., Pittsburgh, has issued a leaflet illustrating two recently built auto floor chargers. Photographs of the machines supplement descriptions of construction and operation.

LIGHTING UNITS—Benjamin Electric Mfg. Co., Des Plaines, Ill., has issued a 6-page leaflet describing its line of explosion-proof lighting units. Pendent, ceiling and bracket units are illustrated. The leaflet includes specifications and prices.

FLOORS—Stonhard Co., 401 North Broad street, Philadelphia, has issued a 6-page leaflet describing its concrete surface treatment. Uses of the company's floor protection product are illustrated with many photographs.

ENAMEL—"Enamel Storage" is the title of an 8-page booklet by H. G. Wolfram, recently issued by the Porcelain Enamel & Mfg. Co., Baltimore. Booklet suggests the utilization of water from the mill room for the temperature control of enamel storage.

FLOORS—A 12-page file folder booklet issued by the Acme Steel Co., Chicago, describes and illustrates installations of the company's floor armor in both old and new buildings. The booklet contains the experience record of many users and a statement of the advantages of steel floor protection.

RAILWAY CARS—Koppel division, Pressed Steel Car Co. Inc., Grant building, Pittsburgh, has issued a 16-page bulletin describing its line of industrial railway cars and accessory equipment. All equipment is illustrated with photographs and cross section drawings.

CONVEYORS—Gifford-Wood Co., Hudson, N. Y., has issued a new bulletin, No. 138, on materials handling systems. The bulletin pictorially illustrates five steps in the selection of handling systems, namely: Survey, design, proposal, installation, and maintenance.

OVENS — Crawford Oven division, American Machine & Foundry Co., New Haven, Conn., has issued a 44-page catalog of industrial ovens and dryers. The catalog is in numerous sections, and covers such processes as baking, drying, curing, japanning, enameling, polymerizing, low temperature annealing, expansion heating, wax, asphalt and compound melting, and other processes involving temperatures up to 1000 degrees Fahr. Standard size ovens of both conventional and convector type are illustrated, described, and dimensioned.

ELECTRIC TOOLS—Skilsaw, Inc., Chicago, recently has issued a 58-page catalog describing its line of portable electric tools. Tools illustrated are handsaws, drills, belt sanders, disk sanders, grinders, blowers, and floor sanders. Detailed specifications and prices are given.

HEAT TREATMENT—"Homo Method for Nitriding" is the title of a 16-page catalog recently issued by Leeds & Northrup Co., 4901 Stenton avenue, Philadelphia. Profusely illustrated, the new publication includes graphs showing the effects of time and temperature on surface hardness and case depth.

ARC WELDERS—Hobart Brothers Co., Troy, O., has issued a 24-page booklet describing the construction and operation of its multirange dual control arc welders. Models illustrated are both stationary and portable, electric and gasoline drive. Photographs, sectional drawings, and tables give construction details and specifications.

RESEARCH—"Research for Ceramic Industries" is the title of a 16-page booklet recently published by the Battelle Memorial institute, 505 King avenue, Columbus, O. The illustrations of the booklet give a general view of the institute's work in ceramics. The booklet itself serves as an invitation to visit the laboratories and investigate the institute's facilities and personnel.

CONTROLLERS—C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., recently has issued a 60-page catalog, No. 1060 D, describing its indicating, recording and controlling instruments for temperature and pressure. These include recording thermometers, recording pressure gages, recorder-controllers and indicating controllers. The catalog is profusely illustrated, and contains specifications and construction details.

STOVES—Sidney Flavel & Co. Ltd., London, England, has issued a 74-page booklet entitled "How We Build." Booklet describes the changes that have been made in the company's products during the past 160 years, and illustrates its new line of stoves and fireplaces. The booklet is well illustrated with many old prints and etchings, as well as with many new photographs.

METERS—A 32-page bulletin, No. 102-B, describing the applications of its automatic combustion control meters has been issued by the Bailey Meter Co., Cleveland. In Addition to describing and illustrating the various elements of the control systems, the bulletin explains fundamental principles involved in controls, both for boilers fired with stokers and for boilers fired with fuels in suspension.

TRACTORS—Capacities, specifications and mechanical features of the largest tractor of the Caterpillar Tractor Co., Peoria, Ill., have been grouped together in a new booklet, No. 4876, just issued by that company. Printed in two colors, the book is illustrated profusely. Pictures show the tractor on the job, as well as many cutaway views of engine and drives.

MACHINE TOOLS—Scully-Jones & Co., 1901 South Rockwell street, Chicago, has issued a new 320-page catalog illustrating its line of standard and special tools. Among the tools described are arbors, boring bars, spindles, facing and chamfering tools, core drills, counterbores, reamers, wear resisting alloys, adjustable adapter assemblies, and hollow mills. All tools are illustrated, and complete dimensions and prices are given.

THE SIMPLICITY PORTABLE SAND UNIT

SCREENS, MIXES

AERATES AND FLUFFS

IN ONE OPERATION

Install a guaranteed unit, built by a company with a real background of experience.

SIMPLICITY ENGINEERING COMPANY
DURAND, MICHIGAN
For Canada: Waterous Limited, Brantford, Ontario

ESTABLISHED 1788
one hundred and fiftieth anniversary

THE E. & G. BROOKE IRON COMPANY

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Manufacturers of
Basic, Malleable, Foundry, Forge and Low Phosphorus Pig Iron

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BIRDSBORO, PENNSYLVANIA

PROTECT YOUR WORKERS' HEALTH AGAINST DUSTS!

Here is* DEPENDABLE *protection!

Constant inhaling of dusts is a menace to workers' health and efficiency. It often leads to more serious lung diseases. Protect your workers—and your firm—by supplying the M-1100 Dust Respirator. Men will be safe against severe concentrations of fine dusts. The M-1100 is light—comfortable—permits easy, natural breathing. Does not obstruct vision or wearing of goggles. Officially approved for safety*. Send your order today. Or write for full information to Pulmosan Safety Equipment Corp., Dept. F 176 Johnson St., Brooklyn, N. Y.

PULMOSAN M-1100 DUST RESPIRATOR

**Approval BM-2109 of U. S. Bureau of Mines.*

YOU'D SMILE, TOO--
if your cores were pasted with "STIKTITE"--our strong, fast drying core paste. It stands up under high temperatures, and does not swell in the joints. Can be used as a core binder too. I'll send you a sample if you'll say the word.
Bill Gagger

We Distribute
Glutrin Goulac Purite
"Volclay" Wyoming Bentonite
Soapstones Silica Flour

We Manufacture
Seacoals, 10 different grinds.
Core Compounds, Plumbagos, Blackings, Core Washes - - in grades for every purpose.
Parting Compounds: Tripoli, Non-Silica, Liquid.
Core Paste, Paste Binder, Dust On Facing, Special Facings and Compounds to fit any job.

LEADERS FOR 59 YEARS..
The Smith Facing & Supply Co.
1857 Carter Rd., Cleveland, Ohio
RADIANT FACINGS Since 1879

Guarantee — 1500 Hours with Steel Abrasive—750 Hours with Sand

EVERY DOLLAR invested in a PANGBORN-NORBIDE* nozzle will pay you a handsome profit. Lined with the hardest substance made by man for commercial purposes, these nozzles will outlast the ordinary cast iron type as much as 1500 to 1! A size and shape for every blast cleaning requirement. Write today for data.

*Trade-mark of Norton Co. for Boron Carbide.

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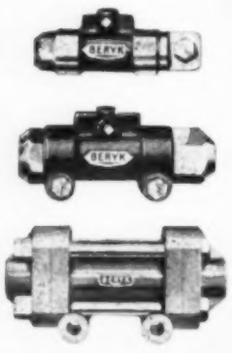
The World's Largest Manufacturer of Blast Cleaning and Dust Collecting Equipment
HAGERSTOWN . . . . MARYLAND

How to be Money Ahead on the
VIBRATOR PROBLEM



● Most foundry vibrators are good, but for 25 years BERYK has specialized in making them a little better, and longer-lasting. For instance, every BERYK is now constructed with a cast body of nickel-chrome-moly iron having a tensile strength of 50,000 lbs. per sq. in. and a precision ground piston of heat-treated, oil-hardened alloy steel. Efficient under all conditions and *operates in any position.* Available from ½" to 3" for all types of molding machines and pattern plates. *Fully guaranteed.* Your order shipped one hour after received. Folder and prices on request.

THE BERYK COMPANY
1256 WEST 2nd ST., CLEVELAND, O.

FOR BLOWING CORES
INSIST ON
SMILLIE VENTS
for

- Greater Vent Area
- No loss of sand
- No Saggy Cores
- Longer Life
- Machinable for Contours
- Sturdy Construction

Sizes from 1/16" to 1" in 1/16" steps.

We also manufacture a complete line of Flask Pins and Bushings.

Samples and prices upon request

C. M. SMILLIE & CO.
520 E. Larned St. Detroit, Mich.

COMB'S GYRATORY RIDDLES

Greatly Reduce Riddling Costs Through Speed and Labor Saving

Available in four types and sizes, Comb's Gyratory Riddles are noted for their low maintenance cost (½c to 1c per hour) and their enormous capacity.

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30 DAYS FREE TRIAL

Write for descriptive catalogue; choose the type best suited to your needs and use it for 30 days. We pay the freight both ways if you decide to return it!

GREAT WESTERN MFG. CO.
Leavenworth, Kansas

THE
JACKSON IRON & STEEL COMPANY
Manufacturers of
"JISCO"
SILVERY
PIG IRON SPECIALTIES
■
JACKSON, OHIO

HAUSFELD FURNACES

Make the best known Alloys
With the cheapest known fuels

THE above Hausfeld Tilting Type Crucible furnace No. 625 is one of a battery in a foundry famous for the uniformly high quality of its non-ferrous alloys. Equipped with roller bearings and directly connected with city gas line with proportional mixers and zero governors, these furnaces effect substantial savings in production costs. Where natural or artifical gas is not available these furnaces burn fuel oil with equally satisfactory results.

Write for Catalog and Literature describing our new Multiple Burner Furnaces

The Campbell-Hausfeld Company
300-320 Moore Street — Harrison, Ohio

Wanted . . . Practical Foundrymen To Learn

McLAIN'S SYSTEM

Scientific Cupola Control and Metallurgy of Gray Iron Foundry Practice.

A Home Study Course.

DIPLOMAS WHEN YOU GRADUATE

David McLain

FOUNDRY OWNERS

Our Cupola Report Has Enabled Others to Reduce Total Melting Time, Improve Quality of Metal, And On Heats of 30 to 100 Tons, Have Saved $10 to $60.

Consulting Service Is Free For The Life Of the Course.

Two Of Every Three Foundry Experts Are Following Our System.

Write For Free Information.

McLAIN'S SYSTEM, INC.
803 Goldsmith Bldg., Milwaukee, Wisc.

SAND MIXERS

Batch and Continuous Types
Complete Core Sand Mixing Layouts—
Automatic Scales, Liquid Controls, etc.

MOLDING MACHINES

New and Used
GRIMES MECHANICAL NIGHT GANG
For Better Sand at Less Cost

GRIMES MOLDING MACHINE SALES
1429 Virginia Park — Detroit, Mich.

NEWEST NEW in Grinder Construction

THE Hammond "MULTI-HI" SPEED

2 - 3 - 4
or
VARIABLE SPEEDS

- Only a minute to change speeds.
- Overspeed Proof.
- For wheels to 30" diameter.
- With 10 to 25 H.P. motor.

It Reduces Grinding Costs!

Hammond Machinery Builders
KALAMAZOO, MICHIGAN, U.S.A.

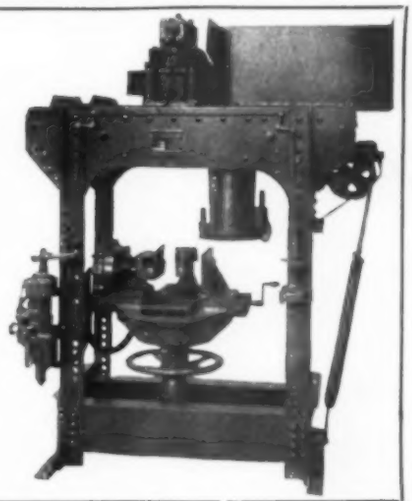
● Ask for NEW Catalog No. 1605

DEMMLER
CORE BLOWING MACHINES

A record of long service in well known production foundries.

We have a machine for your requirements.

WM. DEMMLER & BROS.
Kewanee — Illinois



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REPRESENTATIVE WANTED

To sell core oil and kindred products on liberal commission basis. Exclusive territories available. Reply Box 461, THE FOUNDRY, Cleveland.

REPRESENTATIVE WANTED

with practical coremaking or foundry experience to sell and apply core oils, etc., to the metal working industries in the middle-west in a protected territory, and to act as a trouble shooter in other territories. Applicant must be under 40. Salary, expenses and bonus. Give full particulars first letter. Address Box 502, THE FOUNDRY, Cleveland.

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with ability, personality and past record; full details in own handwriting, giving references, photo and salary expected in reply. Address Box 498, THE FOUNDRY, Cleveland.

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This thoroughly organized advertising service of 28 years recognized standing and reputation carries on preliminary negotiations for positions of the caliber indicated, through a procedure individualized to each clients personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered, and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.

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ATTENTION FOUNDRY OWNERS

Write or wire us for technically-trained practical foundry foremen, superintendents, production managers, chemists, metallurgists, core foremen, cost clerks, salesmen, patternmakers, melters (electric, open-hearth, converter and cupola). No charge. **McLAIN'S SYSTEM, INC., 804 Goldsmith Bldg., Milwaukee, Wis.**

SALARIED POSITIONS — FOREMEN — MANAGERS—SUPERINTENDENTS

Our system of searching out higher-bracket salaried positions, hiding your identity, increases your salary commensurate with training and experience, and with definite results. Write **Foundry Department, EXECUTIVE'S PROMOTION SERVICE, 300 B-STREET, S. E., WASHINGTON, D. C.**

Positions Wanted

FOUNDRY SALESMAN

Practical foundryman calling on foundry trade in New England, New Jersey and Eastern New York, wishes to contact equipment manufacturers wanting representation in above territory. Address Box 500, THE FOUNDRY, Cleveland.

Positions Wanted

GRAY IRON SUPERINTENDENT

Foundry executive 15 years. Practical experience, coremaking, molding, cupola practice and patternmaking; expert rigger for high production at minimum cost. Efficient and up-to-the-minute in all modern methods of foundry practice. Ability to handle all classes of help successfully. Address Box 168, THE FOUNDRY, Cleveland.

BRASS FOUNDRY FOREMAN

wants position. 25 years practical experience on chandelier castings, valves, ornamental bronze, aluminum and general jobbing and production work. Willing to start as bench or tub molder. Union or non-union foundry. Address Box 503, THE FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

20 years in foundry supervisory capacities. Gray iron, semi-steel, nickel alloy, high test iron. Experience includes high grade machine tool, gas and diesel engine, general jobbing and production. Light, medium and heavy. Familiar with sand slinger. McLain's system cupola practice. Know foundry costs and estimating. Exceptional ability handling labor. Good personality. Address Box 453, THE FOUNDRY, Cleveland.

PACIFIC COAST

Molder, desires position as foreman in iron foundry. Technical graduate. Mix by analysis. Address Box 507, THE FOUNDRY, Cleveland.

SERVICE MAN
OR
TROUBLE SHOOTER

Available for pig iron, coke, foundry supply or metallurgical concern. Excellent reputation for locating trouble in bad castings, where difficulties with sand, molding, gating, cupola practice and mixtures exist. Good character and personality. Address Box 454, THE FOUNDRY, Cleveland.

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20 years experience general jobbing work. What foundries need are men who can get work out faster and cheaper and can qualify in this respect. Guarantee 100% work. Know cupola practice. Am willing to start on floor to prove my ability. "Seeing is believing." Address Box 483, THE FOUNDRY, Cleveland.

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Sold my foundry business, would like to contact progressive organization. Am practical foundryman in all departments. Expert on match plate work. Age 34. Address Box 505, THE FOUNDRY, Cleveland.

CLASSIFIED RATES

Position Wanted advertisements; minimum ad 30 words, $1.50, additional words 5c each.

Help Wanted advertisements; minimum ad. 50 words $3.00; additional words 6c each.

For Sale, Wanted and Miscellaneous advertisements, 10c per word, minimum advertisement $3.00.

Reduced rates for three or more insertions.

First line is set in bold face type. A box address counts as six words.

Positions Wanted

METALLURGIST

Experienced in technical control and operation of gray iron and malleable foundries and laboratories. Responsible for suitable quality with economical production. Address Box 433, THE FOUNDRY, Cleveland.

GENERAL FOUNDRY FOREMAN

Eighteen years foreman gray iron, heavy or light, jobbing and production castings. Can rig and produce. Good handler of men. Go anywhere. Best references. Address Box 487, THE FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Desires position with shop making high grade work. Practical molder, semi-steel alloys. Technical training. Age 41. Address Box 428 THE FOUNDRY, Cleveland.

FOREMAN—GRAY IRON, SEMI-STEEL

desires position in small to medium size foundry, practical molder, technical graduate. Age 37. A producer, good personality and good handler of men. Address Box 393, THE FOUNDRY, Cleveland.

GRAY IRON SUPERINTENDENT

foundry executive. 25 years practical experience coremaking, molding, cupola practice, pressure castings, valves and fittings, in green and dry sand. Proven ability to handle all classes of help successfully. Address Box 403, THE FOUNDRY, Cleveland.

STEEL FOUNDRYMAN

desires connection as superintendent or assistant superintendent. Metallurgical engineering graduate. 14 years steel foundry experience. 6 years on stainless steel and heat resisting castings. Age 40. Address Box 450, THE FOUNDRY, Cleveland.

BRASS FOUNDRY SUPERINTENDENT

on nonferrous castings such as valves and fittings production work in green and dry sand. 25 years successful foundry manager; can furnish references. Address Box 402, THE FOUNDRY, Cleveland.

METALLURGIST

Thorough knowledge and experience in converter steel, gray iron, and bronze foundry practice, also heat treating, forging, testing of materials, control of processes. Address Box 480, THE FOUNDRY, Cleveland.

MANAGER, ENGINEER
METALLURGIST, SUPERINTENDENT

Seasoned and experienced young foundryman. Gray iron, malleable, and steel. Cupola and electric furnace. Production or jobbing shop. Know sands, rigging and how to handle men. Two degrees in metallurgy. Good personality. Clean successful record. Best of references. Go anywhere. Address Box 481, THE FOUNDRY, Cleveland.

Classified Ads

Positions Wanted

GRAY IRON FOUNDRY SUPERINTENDENT OR FOREMAN

Technical, practical molder and foundryman. Twenty years experience on production work; stoves, furnaces, light and medium jobbing; all types molding machines; sandslingers, sand control and production equipment for continuous operation. Address Box 494, THE FOUNDRY, Cleveland.

GRAY IRON SUPERINTENDENT OR FOREMAN

now employed. Eighteen years executive experience. Efficient in modern methods of foundry practice. Practical in molding green and dry sand, coremaking and cupola practice. Address Box 466, THE FOUNDRY, Cleveland.

GRAY IRON FOUNDRY SUPERINTENDENT OR MANAGER

36 years old; 16 years practical, technical and selling experience; desires change. Address Box 475, THE FOUNDRY, Cleveland.

GRAY IRON SUPERINTENDENT

Foundry executive that can handle entire foundry or any department. Practical experience in all departments and expert rigger for low cost production. Address Box 506, THE FOUNDRY, Cleveland.

METALLURGICAL ENGINEER

with intensive experience with all types of foundry equipment will guarantee maximum economy consistent with correct physical properties from all classes of metals. Now employed but wishes a position where proved expert metallurgical knowledge and its successful industrial application is required and where advancement and recompense will depend upon actual savings in foundry operations and in the product. Address Box 504, THE FOUNDRY, Cleveland.

FOUNDRY AND MACHINE SHOP PRODUCTION

20 years experience in charge of production planning, assignment of work to departments and machines, and follow-up. Address Box 499, THE FOUNDRY, Cleveland.

FOUNDRY ENGINEER

Practical experience in brass, aluminum, malleable and gray iron. Technical graduate. 15 years experience designing, building and maintaining equipment and machinery for automobile foundry. Address Box 509, THE FOUNDRY, Cleveland.

ELECTRIC STEEL FOUNDRYMAN

desires position as foundry superintendent. Fifteen years experience in electric steel foundry as metallurgist, melter, foundry foreman on steel, manganese steel and heat resisting alloys. Expert at metallurgical control. Address Box 497, THE FOUNDRY, Cleveland.

Foundry Wanted

WANTED — IRON FOUNDRY

Small 10 to 20-ton daily capacity for cash or will take substantial interest. Eastern Pennsylvania, New York or New Jersey. Give particulars in first letter. Address Box 501, THE FOUNDRY, Cleveland.

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, THE FOUNDRY, Cleveland.

WANTED TO BUY

One or more No. 75-J Osborn air squeeze molding machines, or similar size Arcade air squeeze molding machine. Address Box 508, THE FOUNDRY, Cleveland.

For Sale

REBUILT BLOWERS—FANS—EXHAUSTERS

Connersville-Roots positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY
406 N. Peoria St. Chicago, Illinois

DISCONTINUING GRAY IRON FOUNDRY

Selling considerable equipment, including No. 2½-A Whiting Cupola. If interested address **Bloomer Bros. Company, Newark, New York State.**

FOR SALE

640 3/16" Flask Bands. Various sizes, in good condition. **St. Louis Steel Casting Co., 100 Mott St., St. Louis, Mo.**

FOR SALE

Miscellaneous foundry equipment, including steel bands, tight iron flasks, wood snap flasks, fans, blowers and molding machines. **Address P. O. Drawer 981, Erie, Pa.**

FOR SALE

Machinery—will sacrifice 8-inch Standard Pipe Cutter, Pond Lathe, Gisholt Turret, Becker Millers, Gleason Gear Generator, Acme, Boush Multi Spindle Drill, Eberhardt Grinder, Shear, Booth Brass and Hoskins Electric Furnaces, Olsen Spring Testing Machine, etc.

Highway Trailer Co.
Edgerton, Wis.

FOR SALE

Six compartment Type 'S' Dracco Filter with 2700 sq. ft. wool bag filter area, automatic shakeout, extra large storage hopper, automatic thermostat control on air inlet, damper, complete with necessary steel supports, blower and motor rated at 10,000 c.f.m. together with Howes "Invincible" bagging machine. Used only a few months for zinc oxide. Priced for prompt sale. May be seen at **Detroit Electric Furnace Company, 825 W. Elizabeth St., Detroit, Mich., or inquire Dracco Corporation, Cleveland, Ohio.**

For Sale

BIGGER BARGAINS THAN EVER

Furnaces, Cupolas, Blowers, Exhausters, Compressors, Mold Machines, Tumblers, Hoists, Core Machines, Mixers, Motors, Power Equipment, etc. Hundreds in stock. 20 years fair dealing with the foundries. Tell us your needs for better production and money savers.

CLIFTON MACHINERY CO.
1023 W. 6th St.
CINCINNATI, OHIO

REBUILT USED EQUIPMENT

Tumbling Mills, round, square, any size. Molding machines, air and hand operated. Sand Mixers, cupolas, cranes, vibrators, air and electric grinders, stationary and portable, air and electric. Steel and cast iron flasks any size. Snap Flasks, straight and taper, wood and metal. Most any item used in the foundry.

Haynes Foundry Equipment Company
815 Fulton St., Kalamazoo, Michigan

REBUILT & GUARANTEED EQUIPMENT

12—10" Tabor, Osborn & Arcade Jolt Squeezers.
2—30" Tabor Hand Ram Air Rollovers.
1—22" Tabor Air Jarr Rollover.
2—No. 2 Demmler Core Blowers.
1—6' diam. No. 2 Simpson Mixer.
2—Model B Royer Sand Throwers.
2—Axman Sand Throwers.
3—No. 4 Wil. Green; 1—No. 5 Roots Blower.
24", 36"-42"-48" Tumbling Mills.
96'-176'-360'-540'-1578' Air Compressors.
1 to 5-ton Shepard & LoHed Electric Hoists.
3—50-ton 32' to 75' A.C. & D.C. Elec. Cranes.

"IN STOCK FOR PROMPT SHIPMENT"
T. B. MacCabe Co.
Beury Bldg., Broad & Airdre St., Phila., Pa.

MOLDING MACHINES

1 International Type "F" jar ramming, power turn-over power draw, 37" - 25" draw, 4100 lbs. cap. @ 80 lbs. pressure (enclosed cylinder type).
1 International Type "F" 27" x 12" draw, 1400 lbs. cap. @ 80 lbs. pressure (enclosed cylinder type).
1 Osborn No. 404 jolt roll-over pattern draw, 40" x 54" pattern draw 15", 1500 lbs. cap. @ 80 lbs. pressure with run-out mold car, 9" dia. cyl.
1 Herman 40" x 56" Independent turn-over and pattern drawing device 40" x 50" Bumper, 3000 lbs. cap. @ 80 lbs. pressure, 8" draw cylinder.
1 Tabor 30" hand ram, power roll-over power draw, portable, 10" draw, 1350 lbs. cap. @ 80 lbs. pressure.
4 No. 832 Milwaukee hand jolt and roll-over, foot draw, portable, 8" draw, 15" x 32" table.
1 No. 142 Milwaukee jolt squeeze stripper, stripping cap. 1200 lbs. — 6" draw, 19" x 35" table.

SQUEEZERS

2 International "PJS" swinging head jolt squeezer 14" x 18" table, 9" dia. cyl.
3 No. 104 Milwaukee portable jolt squeezers, 17" x 21" table, 10" dia. squeeze cylinder.
4 Int. "JS" jolt squeezers, 9 - 32" portable.
2 Int. "H" plain air squeezer, 9 - 32" portable.
6 Tabor stationary plain air squeezer, 13" - 36".
4 Osborn No. 74 W straddle type plain air squeezer, portable, 8½" - 33" 15 x 18" table.

MISCELLANEOUS

1 Detroit "AA" Elec. Furnace, 750 lbs. cap. including 300 KVA Transformer, 355 gal. oil capacity.
1 Royer Model "D" Sand Separator and Blender, portable, 800 lbs. sand cap., 2 H.P. 220V AC motor.
1 Eclipse-McKee size 2515 Pressure Blower equipped with 3 H.P. GE 3600 R.P.M. AC motor.
1 1000-lb. Link-Belt Hoist with 3.5 AC motor, floor operated, 30 ft. lift, speed 50 F.P.M.
1 5-ton Shepard Crane, floor control, span 18' 5", 6 H.P., 220V DC motor, box girders.
1 No. 2 Slyblast Mill 30" x 30" complete with 3 H.P. AC motor, pressure tank and sand elevator.

Our LIST No. 66 shows COMPLETE STOCK of Foundry and Industrial Equipment Bargains.

SCULLY-JONES & COMPANY
19th & Rockwell Sts. -:- Chicago, Ill.

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